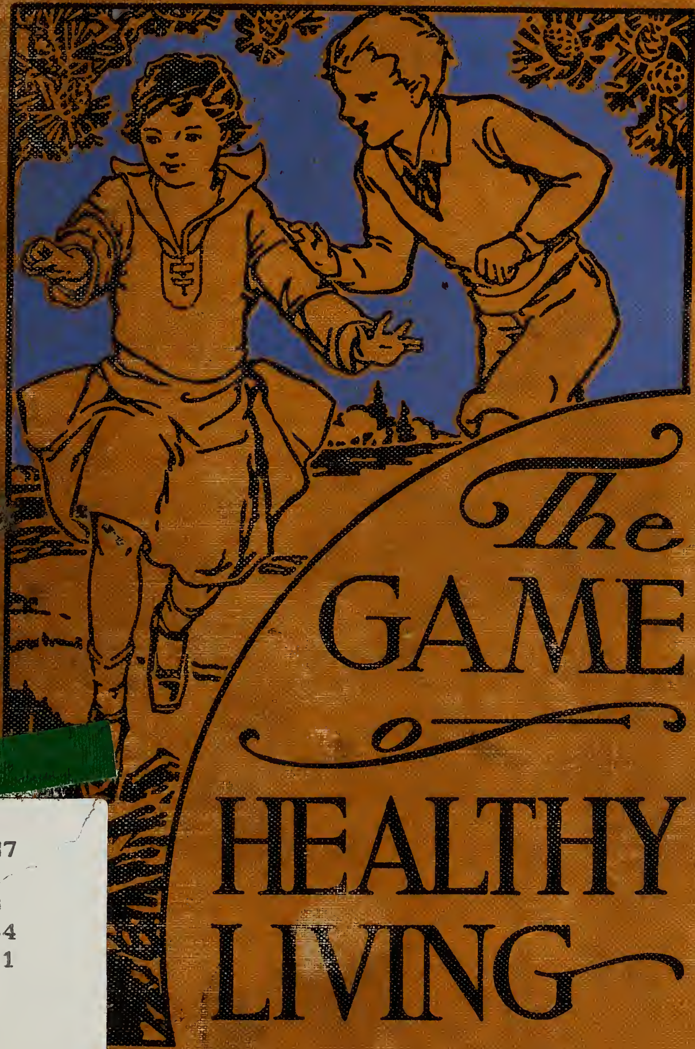
The New Healthy Living Series



The GAME of HEALTHY LIVING

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THE NEW HEALTHY LIVING SERIES

THE GAME OF HEALTHY LIVING

BY

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PREFACE

In the preparation of The New Healthy Living Series we have taken the following fundamental educational principles as our guides:

1. Health education should be positive, not negative, in emphasis. It should stress the splendor of health, not the fear of disease; and it should avoid morbid medical detail.

2. Health education should be practical and concrete. It should—all of it—focus on the conduct of life, on the formation of health habits, in school and in after years.

3. On the other hand, health education should have a definite and satisfying intellectual content. It should be more than a routine drill in health habits, conducted as one would teach a dog to do tricks. It should establish sound conceptions of the human machine and its operation as a basis for the development of health habits.

4. Finally, health education should, at all possible points, correlate with other subjects in the school curriculum and with education in social responsibility and citizenship.

The New Healthy Living is issued in two editions, a two-book series and a four-book series. This volume, The Game of Healthy Living, is the first book of the four-book series. We have attempted to lay a sound psychological basis for all the work in hygiene by developing a vital interest in the game of healthy living. Interest is centered on health habits as part of the game. A simple background of physiological fact is supplied for such essentials as foods, digestion, breathing, care of the skin, posture, and exercise. A chapter on safety and a check up on Health Diaries complete a beginning book consistently based on child activities

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and interests. In the second book, THE HABITS OF HEALTHY LIVING, special emphasis is laid upon health habits. The third volume, THE LAWS OF HEALTHY LIVING, is designed to satisfy the curiosity of the child as to the reasons for health rules. Only by knowing the reasons for our habits can we modify those habits to meet new situations in the future. The fourth book of the series, THE HEALTHY COMMUNITY, deals with the broader aspects of the health problem in home and community.

As has been said, in selecting and preparing the material for these books, we have constantly kept in mind the soundest of modern educational theories and principles. The same care has been used in preparing the questions and problems suggested in the text. These should, we believe, be of special assistance to the teacher. The questions and problems which follow each chapter inspire independent thought and lead to permanent interest in the applications of health knowledge to everyday experience.

We express our appreciation of the courtesy of Dr. Anna M. Baetjer, Associate in Physiology in the School of Hygiene, Johns Hopkins University, who has read and criticised the text.

C.-E. A. WINSLOW
MARY L. HAHN

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WHAT THIS BOOK IS ABOUT

It is a late October afternoon on a field where posts have been set up for playing football. The air is cool and crisp. Two teams of boys are lined up for an exciting game. The signals are given. The half-back has the ball. Tackle and guard push their opponents out to one side and he leaps through. The backs on the other side run toward him. He dodges first one and then the other. He dashes down a free field for a touchdown. He has a strong, healthy body and a quick, healthy mind. He helped to win the game for his side.

Or it is a spring evening and the girls of the school are giving an exhibition. Some are in white, some in pink, some in pale blue. They bend and sway and cross each other in the dance, graceful and lovely. Everyone says, "How beautiful!" They too, like the boys on the football team, have trained their bodies and their minds.

Such training does much more than help to win football games and make girls graceful. It lays the basis for strength and success in life.

Nearly two hundred years ago, a boy of sixteen, with one companion, passed through the Blue Ridge Mountains of Virginia into what was then the wilderness beyond. They had been sent out to make a survey of some wild lands. Often they were wet and cold and hungry. They slept in tents or the huts of settlers in the forests or out under the stars. They met a war party of Indians. They swam the Potomac River in flood. But they did their work and returned safely.

The "fine, handsome, athletic boy" who made this trip went back again into the wilderness many times. He became the leader of the people of his state in fighting the Indian tribes. He became general-in-chief of the armies of the Republic and its first President. His life shows us what a strong, healthy body and a strong, healthy mind can do for one's country as well as for oneself.

Strength, beauty, service,—these are the things that come from Healthy Living. George Washington learned how to develop health of body and mind in the wild forests. We do not face such hardships today. But the need for strength, beauty, and service is just as great as in Washington's time. This book will tell you something about your body and your mind and how they can be made strong and healthy. It will help you to play the game of life well and to win its prizes for yourself and for others.

THE GAME OF HEALTHY LIVING

CHAPTER I

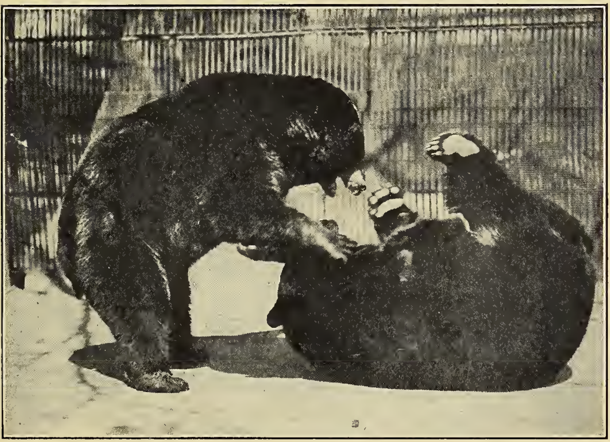
BEING ALIVE

The Signs of Life.—What are the things that interest you most, as you walk home from school or wander about in the woods? Why, the things that are alive, of course. Some of you, perhaps, collect minerals; and they are attractive, particularly the shiny, bright-colored ones. Most of you, however, find flowers more beautiful than stones. There are a great many more kinds of flowers than there are of stones. Animals are still more interesting. Beetles crossing the path, butterflies slowly waving their wings on a thistle head, frogs in the meadow, fishes in the stream, squirrels in the trees, birds balancing on the telegraph wires—how interesting it is to try to get near them and see what they are doing. In the city, the things some of you look for most eagerly are the cats on the window sills and the dogs on the doorsteps. Most interesting of all, in country or city, are your own friends and playmates. The flowers, butterflies, birds, squirrels, cats, dogs, and children are all alive, and that is what makes them such good fun.

The wisest men do not know what life is, but they do know the signs of life which make living things so much more interesting than lifeless ones. Once a class was discussing what "life" meant. One of the girls said, "Life means the power to grow, and all the things we do that little pebbles on the bottom of a pond can't do." The pebbles, even when they are brightly colored ones, are not so interesting as the fishes in the pond. Throwing food into the water is fun because the fishes watch for it and then eagerly snap it up. Some living things do not move about like these fishes, but all living things grow. Seeds are interesting because they will grow into plants or trees. The things that we like best are usually those which show most signs of life.

The thing that makes us like some people as soon as we see them is that they look so very much alive. Sleeping boys and sleeping girls are breathing—a sure and very important sign of life—but a chum who is awake, ready to talk and work and play, is much more fun.

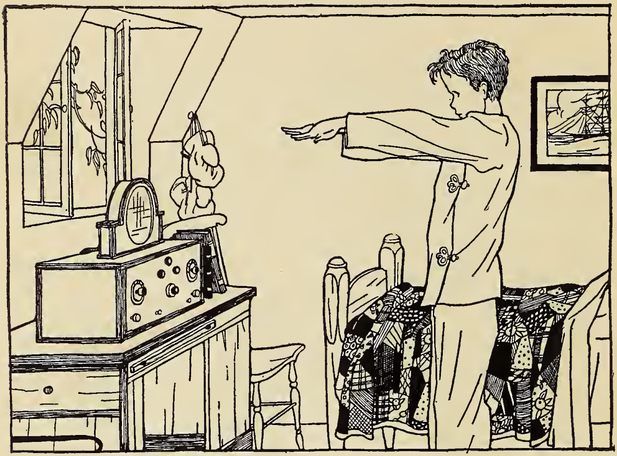
Health, Wealth, and Happiness.—Some boys and girls seem more alive than others. They are cheerful and happy. They get on well in school. In games they often win and always play with a good sporting spirit. Everyone likes them. They have healthy minds in healthy bodies. They are free from the tired, half-sick feeling that makes a child unhappy and disagreeable to his friends. Some people think that children just happen to be well or ill, strong or weak, happy or unhappy. This is not true. Health and strength and happiness come largely from habits of healthy living. The chapters of this book tell about these habits. They tell about your body and how it does its work and the care which its parts require. If you want to look and feel your best, some time should be spent every day in preparing to "look alive."



YOUNG BEARS LIKE TO PLAY

Animals, like children, need exercise so that they may grow big and strong. (*Courtesy of the New York Zoölogical Society*)

Did you ever think of all the boys and girls in the world who are making themselves "look alive" each morning during the hour from seven to eight? Can you imagine thousands of them waking up every day to the sound of a jolly voice from the radio which says, "Good morning, everybody. Do you feel alive this morning?" How many of these boys and girls jump out of bed, get into a good position—heads up, feet set squarely on the floor—and "look alive" as the friendly radio voice gives directions for lively



LOOKING ALIVE

The radio helps some boys and girls to put "snap" into their setting-up exercises in the morning.

exercises! After morning exercises, there is nothing better than a good cool scrub to wake you up thoroughly. Then, when you have finished brushing your teeth and your hair, you will be all ready for a good warm breakfast—fruit, cereal, a glass of milk, and buttered toast—eaten slowly, which will send you off to school in the best of humor.

A Game to Play Every Day.—Life at school is a success when teacher and pupils look attractively alive and feel comfortably alive, all ready for school work and play. "Work hard when you work and play hard when you play," is a good motto. More food at noon—milk and a green vegetable, or soup, sandwiches, and fruit—keep you fit for the afternoon and supply energy for exercise after school. We all need fresh air and sunshine. Outdoor games and sports are just as important as school lessons. Games played by one team against another are best. They teach you not only to be quick and strong but also how to play and work with others.

The pleasantest part of all the day is the evening. When school is over and playtime is finished, you are ready for a good meal, a little study, a story perhaps; and then to bed so that you can "look alive" on the morning to come. Try to imagine thousands of boys and girls taking warm scrubs, cleaning their teeth, opening their windows so that the air will be fresh and cool, and hopping into good clean beds to rest for ten hours and grow until morning! We can think of all these habits as part of a great Health Game. If we really want to look alive and be alive, we must practice them. Daily practice usually makes one feel so well that school and chores, cleanliness and meals, are part of the best game in the world, the Game of Life.

GET INTO THE GAME!

Exercise in the open air makes strong bodies stronger. (*Courtesy of the Girl Scouts of America*)

Knights Yesterday and Today.—Five or six hundred years ago, in England, France, and other countries of Europe, many boys were eager to become knights. The knight was a trained, skillful soldier. He was bound by a solemn promise to be faithful to his comrades and his overlord and true to his church. A true knight's word must never be broken, and he must be just to his enemies and merciful to the weak and to all those in need. He must be always modest and courteous in his manner and thoughtful of the feelings of others. And so people came to feel that there was nothing nobler in the world than a good knight.

It was not easy to become a knight. The boy who desired this great honor went through a long period of training. It began when he was seven or eight years old. He waited on and helped the older people in the household, and was trained there in courtesy and gentleness. He learned how to carry himself like a soldier and how to use the spear and the sword with which men fought in those days. He learned to ride and climb and jump and to bear the heavy weight of a suit of armor such as knights wore in battle. At last, after perhaps fifteen years of training, he might be brought before the king of the country. Then, as the young man kneeled, the king touched him on the shoulder with a sword and made him a knight.

We do not have knights of this kind in America today, but we want boys and girls who will serve our country as faithfully as the knights of olden times served their king. We honor men and women who are brave and loyal, generous and gentle—just as they did five hundred years ago. It is as true now as it was then that girls and boys cannot grow up to be good citizens and faithful servants of their country unless they train themselves to be strong, as well as to be brave and true and kind.

After Studying This Chapter

Check Yourself by Answering These Questions:

1. How are living things different from things without life?

2. List the different signs of life shown by a plant; by a dog; by a boy or girl. Which list do you think is most interesting? Why?

3. What are the things that a boy or girl should do before breakfast to get ready for the day?

Try One of These Suggestions:

1. Plan to keep a Health Diary. For the first entry, write a list of the things you did during the day from the time you knew you were alive in the morning until you said "good night." Show in minutes how much time you spent making yourself look and feel alive. The diary might read something like this:

"Look Alive"

Awoke at 7:05 A.M.; exercises	2 minutes
Bath, dressing, cleaning teeth, brushing hair, brushing shoes, cleaning nails	20 minutes
Breakfast (orange, toast, cereal, milk)	20 minutes
Walked on errand to store	15 minutes
Walked to school, played in school yard	30 minutes
Recess at 10:30; ate fruit; played out of doors	15 minutes
Noon, walked home, etc.	

Write a day's program in your Health Diary one day each week. Keep your Health Diary faithfully, for you will need it in work which you will be asked to do later on.

2. Find out something about the knights of olden time. What things does our country need in us that are like the services the knights gave their king? Tell how the creed of a boy scout or a girl scout helps us to supply these things.

Discuss These Problems in Class:

1. Look over pages 4 to 6 and make a list of the health habits mentioned. Discuss each one and see whether you know the reason for it.

2. If the class decided to keep Health Diaries, ask each member to write on a piece of paper the number of minutes spent one day in washing, dressing, brushing teeth, and so forth. Do not sign your names. Have a committee examine the papers and report the number who spent 10 minutes or less; between 10 and 15 minutes; between 15 and 20 minutes; between 20 and 30 minutes; more than 30 minutes. Which group is the largest? The class might try to decide the length of time an average person should use in preparing for the day.

3. Ask each member of the class to write how many hours he slept during the past night. No names should be signed. From these reports, a table can be made to show the number of children who slept 8 hours or less; 8 to 9 hours; 9 to 10 hours; more than 10 hours. Discuss the importance of sleep in making you feel alive.

Each pupil may decide for himself whether he is in the best group. If he is not, he should plan changes in his daily habits.

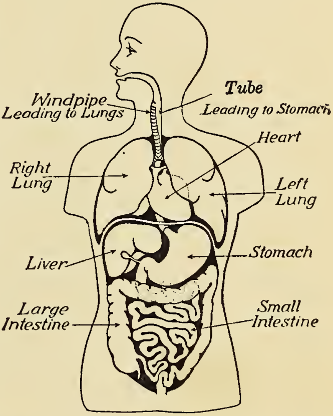
CHAPTER II

OUR WONDERFUL BODIES

How Does Your Body Work?—Living things appeal to us because they grow and move. We like to watch plants in a window box or a garden put forth new leaves and buds and blossoms. The bodies of boys and girls are most interesting when the power is turned on and they begin to move and talk. No human being can "run like a deer," nor is any man "as strong as a horse," though we often use these expressions to mean that a person is unusually quick or unusually powerful. When it comes, however, to things which need skill and delicacy, no animal can match us. When a conjurer does his tricks with cards and coins, he moves his fingers so swiftly that we cannot guess how he managed to make something disappear that had been right under our eyes. When we watch a good tennis player, we wonder at the skill with which he reaches the right place in the court for receiving the ball, and then returns it so that it barely skims the net and lands just where he wishes.

Our bodies are in some ways like machines —like delicate watches or powerful steam engines—

but they can do many things that no machine will ever do. We all like to know how machines work; for instance, how the gasoline in an automobile supplies power to make the wheels go round. When we know how a machine works, we are better able to make it run well and get the most out of it. Bodies, like machines, have many parts. All these parts must work together, and the better they are controlled, the better they work.



SOME PARTS OF THE BODY MACHINE

Can you tell what each of these parts does for the body as a whole?

An old fable related by Aesop tells how the different parts of the body learned that they had to work together. According to Aesop, the Hands complained to the Mouth that they were spending a great deal of time and labor in carrying food for the Stomach. The Teeth also complained about chewing a lot of food for the Stomach, and they decided that it was foolish to spend so much time for the benefit of someone else. The Hands and Teeth agreed that they would not serve the Stomach any longer. In a very short time, however, the Hands began to feel weak. They couldn't work even when they wished to do so. Later, the Teeth began to wonder why they had stopped growing. When the Hands and the Teeth were sympathizing with each other, one of them suggested, "Do you suppose that we need food? Let us ask Stomach what he did with the food we used to give him." Stomach was weak and tired, but he explained, "I used to prepare it for you two and for all the other organs of the body. Intestine helped me get it ready for you, and we passed it on to Blood, who carried it to you. The food Blood brought you for strength and growth always came that way." "Well," exclaimed the Hands and the Teeth, "that is news to us. It seems that we help ourselves by helping you. Good-bye, it's time for us to be very busy."

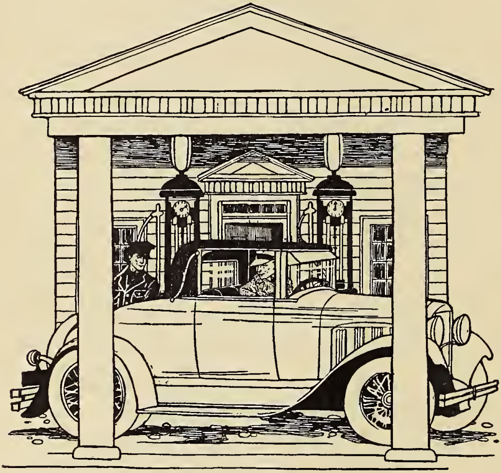
What Are the Parts or Organs of the Body?—First, of course, the human body is made up of head and trunk, arms and legs. The head has in it the brain with which we think and feel, the eyes with which we see, the nose through which we breathe and smell. It also contains the ears with which we hear, and the mouth and throat and tongue with which we eat, taste, and speak.

The trunk contains many very important organs of the body. Some of them are shown on page 11, and we shall learn in later chapters what they do. Even the arms and legs are not simple and solid, like pieces of stone or wood. In our fingers, for instance, we can feel soft muscle and hard bone under the skin. We can see blood vessels on the backs of our hands, and we know from our sense of feeling that there must be nerves, too, in our finger tips.

All the different parts of the body work together to help themselves and to help each other. The general shape of the body and the movements which it makes depend on the bones, the muscles, and the skin. If all these different body parts are properly controlled, they do excellent work. The good swimmer depends on the work of all three when he is in the water. The skin, a perfectly fitted cover for his body, helps to keep him warm. The muscles and bones working together give him power to swim in the water. They also help him to walk, run, jump, pull, and do many other wonderful things on land.

The **skeleton** is the name we give the bony framework of the body machine. The stiff, hard bones make it firm, and the joints allow it to move. Think what our hands would be if they lacked this bony framework and were soft and flabby. Suppose the joints were not there, and each hand was in one stiff piece.

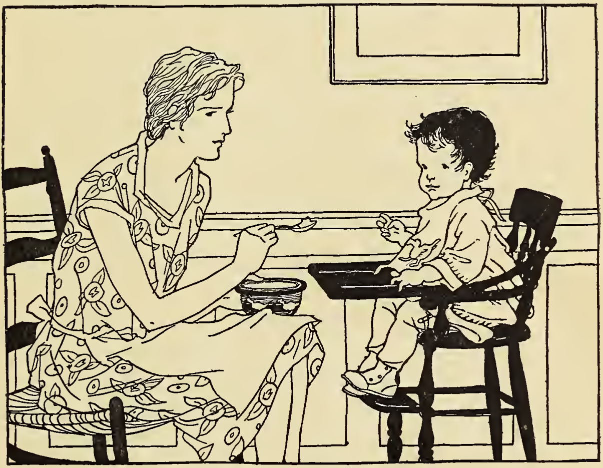
We know that an automobile will not go unless it has gasoline in its tank or electricity in its battery. A steam engine will not run unless coal or other fuel is burned under its boiler. The gasoline or electricity or coal supplies what we call **energy** to run the machine. The body is much the same in this respect. In order to live and move and grow, it must be given food; for food is to the body what gasoline is to the automobile, or coal to the steam engine. The more active we are, the more food we need to keep our bodies working.



THE FILLING STATION

An automobile needs gasoline in order that it may run. What would happen if the tank were not filled?

The process of preparing the food for the use of the body is called **digestion.** The food tube receives the food at the mouth, digests it, and passes the digested food on to the blood. The blood then carries this valuable food through the body to the muscles of the swimmer or the runner, giving his muscles the power to move.



BABY'S DINNER TIME

A child needs food in order that he may live and grow. He gets strength from food, much as the automobile gets power from gasoline.

The lungs, or breathing organs, also work all the time for all parts of the body. They receive air from the nose and pass on to the blood certain substances which the air contains. Just as every part of the body needs some of the digested food from the food tube, so every part needs this substance from the air, and the blood carries them both to all the various organs.

We know that the blood seems to be in all parts of the body, for when we cut ourselves anywhere the blood flows. Through all the living parts of the body, the blood is carried inside a system of closed tubes, the blood vessels, which branch like the branches of a tree, getting finer and finer. Blood is moving through each tube. Whenever blood flows from a cut or a scratch, it is because the walls of some of these fine tubes have been broken. The blood is driven or pumped through all of these blood vessels by the heart.

A body machine with so many important parts needs to be controlled carefully. Perhaps the most remarkable parts of the body are the brain and the nerves, which act as controls or pilots for our body machine. The nerves connect the brain with every part of the body, with the stomach, the heart, the lungs, the skin, the muscles, and even with the walls of the tiniest blood vessels. Day and night, whether we think about it or not, a great many things are going on inside our bodies, like breathing and the beating of the heart. All these activities are kept going in an orderly fashion by messages which are constantly passing from one part of the body to another through the nerves.

As we have read, the principal parts and organs of the body are:

The bones.
The muscles.
The organs of digestion.
The organs of breathing.
The heart and the blood vessels.
The brain and the nerves.

Hygiene is the science of giving all these various body parts, including the brain and nerves, the care which is necessary to keep them in good working order. This book on hygiene makes suggestions as to the ways in which your body should be cared for in order to keep it fully alive.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

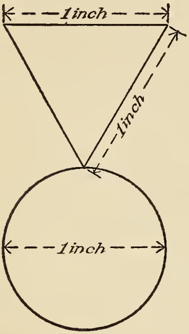
1. What are six principal parts or organs of the body?
2. Explain the work of the food tube.
3. How are the different parts of the body controlled?
4. How would you define the word *hygiene?*

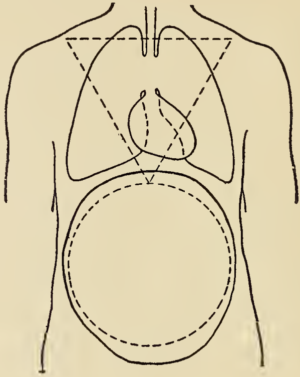
Try One of These Suggestions:

1. Tell or write Aesop's fable as if you were the stomach speaking.

2. Count your breaths for one minute while someone watches the second hand of a watch and tells you when the minute is up. Take care to breathe naturally. Then find out about how many times a day your body does this work of taking a breath of air.

3. Draw outlines of the body, as shown in the diagram, and use them to show the places of the different organs of the body which are named in this chapter.





Discuss These Problems in Class:

1. Think of some machine you know about and discuss in class the ways in which this machine is like the human body.
2. Consider which can do more things, a dog with four legs or a man with two legs and two arms. Why?
3. Divide all the things you can see in the schoolroom into living things and lifeless things. Then see what differences you can think of between lifeless things as a group and living things as another group.

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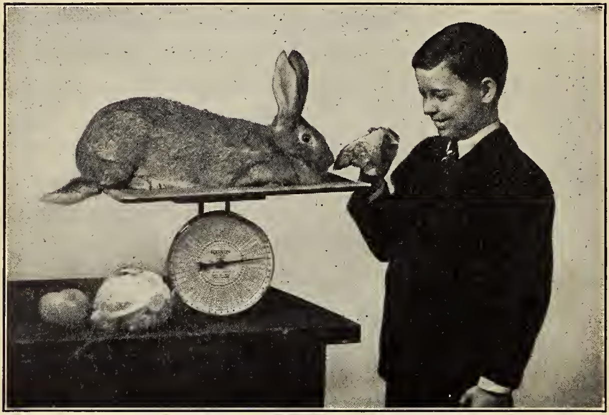
CHAPTER III

MEASURING OUR GROWTH

The Signs of Growth.—Some boys and girls of Tremont School in Cleveland, Ohio, once had a pet rabbit named Brownie, who lived at school for a month. When Brownie ate the ends off the trailing vines in the flower boxes, his need for green food was news which every boy and girl carried home. Brownie's fondness for lettuce, apples, and carrots, the fact that he drank water every day, and that he ate his oats without having them made into oatmeal, also interested his schoolmates. Most interesting of all, however, was Brownie's weighing day, Friday afternoon. All the boys and girls waited breathlessly for this time to learn whether he was growing.

Each week, different boys and girls helped Brownie to practice the science of hygiene, and they knew that the scales would tell whether they had been good helpers. When Brownie was three weeks old, he weighed 8 ounces. The next week he weighed 11 ounces. Then, for three days, he was quite ill, for someone had learned that he liked apples as much as some children like candy. During that week Brownie gained only half an ounce. This experience taught the children to be more careful of the food they gave him, and after that he made a weekly gain of from 4 to 5 ounces.

Watch Yourself Grow.—Growing is a sign of life that we can watch either in a pet or in a plant, and it is always interesting even when we do not measure it. The measurement of growth, however, is important because growth is usually a sign of good health. When a baby grows rapidly, we feel sure that he is receiving good care. During the first year of his life, a baby may outgrow



WEIGHING BROWNIE

Rabbits and puppies, like boys and girls, need the right food in order to grow regularly. Why is Brownie given lettuce?

his clothes every three months. If he weighs 7 pounds at birth, he can often double that weight in six months and triple it in twelve.

The growth of boys and girls often makes their sleeves too short or their coats too tight. But we are not unhappy about this if we stop to think that growing boys and girls are usually comfortable and happy boys and girls.

Growth can be measured in several ways. The most important signs of growth are increases in height and weight. To show the exact change in size due to growth, measuring must be done carefully. Boys and girls in the middle and upper grades should help to make the growth records for the class by measuring one another and by assisting in keeping the records. Here are some points to observe in measuring heights. The picture on page 22 will show you how it is done.

Fasten a tape line or ruler to the wall.

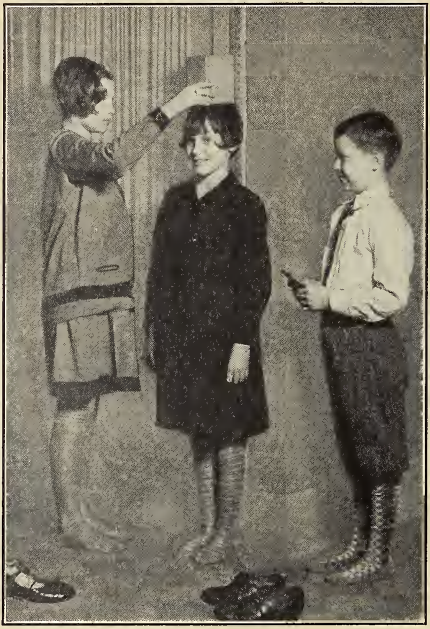
Remove your shoes and stand in front of the measure on the wall.

Stand straight, as shown in the picture on page 22.

Have someone place an empty chalk box on your head and balance it so that it is level. The end of the box touching the wall will mark your height on the measure.

Measure your height once each half year, as boys and girls in the middle grades grow about 2 or 3 inches in a year.

How Much Should You Weigh?—Weight at your age will change more rapidly than height. The usual gain is from one half pound to one pound each month. Weighing day should be a monthly occasion, and here are some suggestions for taking and recording weights.



HOW MUCH HAS SHE GROWN?

Ask some of your friends to help you measure your height in this way. Measure it again next term to see how much taller you are.

Use the scales with care, as scales are rather delicate instruments.

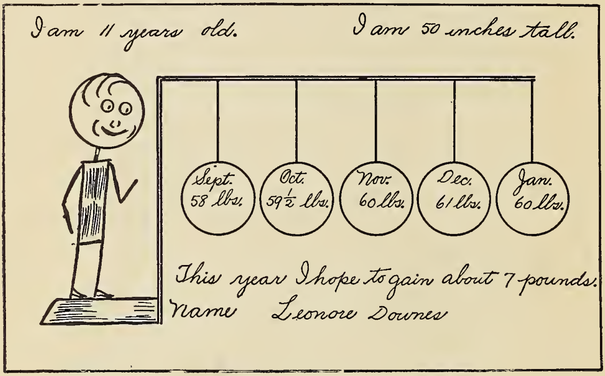
Use the same scales each month.

Weigh at about the same time of the day each time you take a weight record.

Remove your shoes before stepping upon the scales.

Make an outline drawing of a boy or girl on the scales. A 3 by 5-inch card may be used. Write your monthly weight record on this card and take the record home to your parents each month. It is also wise to have a height and weight record card which is kept in a filing box at school and never carried away from the building. This will insure complete records later in the year.

Normal or average weights are often mentioned by the school nurse or doctor, and tables of such weights are given on pages 230–237. To make these tables, one for boys and one for girls, doctors and nurses measured many hundreds of strong, healthy children of different ages and heights. They found most eleven-year-old boys, 55 inches tall, of average type, weigh about 73 pounds. Girls of the same age and height weigh about 74 pounds. However, some eleven-year-olds who are perfectly well and strong weigh as little as 70 pounds, or even less, and some weigh as much as 80 pounds. The important fact to the doctor and nurse is growth. When the records for children of this age and size show gains of a quarter to a half pound every month or nearly every month, they should be marked "good." Gains from a half to 2 pounds are excellent; but gains of 3 pounds or more, if they continue for more than two or three months, often mean quantity without quality. There are differences in the gain in weight at different seasons of the year, for children grow fastest from August to November.


I am 11 years old.
I am 50 inches tall.
Sept. 58 lbs.
Oct. 59½ lbs.
Nov. 60 lbs.
Dec. 61 lbs.
Jan. 60 lbs.
This year I hope to gain about 7 pounds.
Name Leonore Downes

WEIGHT RECORD CARD

Make a card like this for yourself and carry it home every month to show your father and mother how you are gaining.

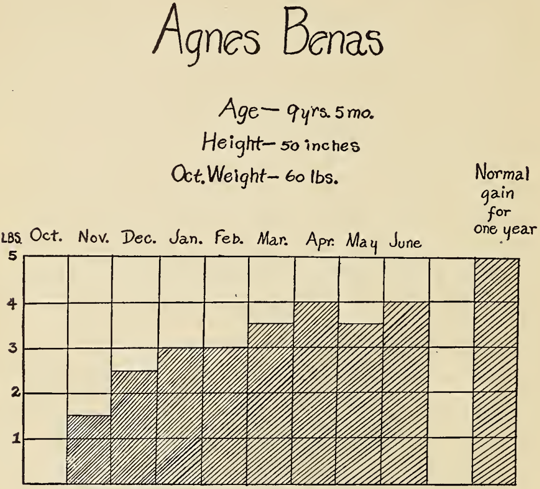
You may learn from the tables on pages 230–237 how much you may expect to grow. The tables show that eleven-year-old boys of normal, average type who are 55 inches tall may gain from 4 to 16 pounds during the next year, depending upon the increase in height. The average, when worked out, shows a gain of about 6 pounds a year for this type. For the normal tall, slender type of boy, the average gain is about 10 pounds a year, while for the normal short, stocky type of boy, it is about 5 pounds. Turn to pages 230–237 and check your own age and height on the tables; then find what yearly gain is expected for your age and height.

The monthly gain of a half pound or a pound is, of course, divided among the different parts of the body. The muscles, the bones, the blood, and the other body organs should each grow to make a little part of that gain. It should never be due to fat only.

Why Do We Grow or Fail to Grow?—This is a question which is often asked on weighing day. The tiny baby can help us find an answer. While the baby was doubling his weight, he had plenty of milk, slept most of the time, and took his daily dozen of exercises by pulling at his toes and waving his little fists about. When anything interfered with his meals, his sleep, or his exercise, the scales soon discovered and reported it.

When you fail to gain in weight, the scales are questioning your health habits. Food, sleep, and exercise affect your weight and that of big people as well as of tiny babies.

Conditions which the school nurse and the doctor discover as they examine boys and girls may also interfere with growth. These conditions may be in the nose, the mouth, the heart, or other parts of the body. Many of them can be corrected by the doctors and dentists. The happy children who really enjoy hard work and hard play are those who are growing normally. Health habits and helpful doctors make it possible for almost all to belong to this group.



A SCHOOLGIRL'S GAIN IN WEIGHT

Do you understand just what this graph means? Was Agnes doing well or not? Can you think what may have made her lose weight in May?

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. In what ways would you measure the growth of boys and girls?

2. About how much should a boy or girl in your grade at school expect to grow each month?

3. What, besides their age, decides the normal weight of eleven-year-old boys? Should all boys this age weigh 73 pounds?

Try One of These Suggestions:

1. Study the directions for weighing and measuring as given in this chapter. Then plan a time when the members of the class can help to weigh and measure each other.

2. Make a permanent height and weight record for each member of the class. This record should never be carried away from school. The name, address, and date of birth should be on the record card, which may be arranged like this:

NAME *Henry Miller* BORN *February 8, 1921*
ADDRESS *425 South Main Street*

DATE	HEIGHT	WEIGHT
Sept. *18*	*55* inches	*73* pounds
Oct. *18*		*74* "
Nov. *19*		*74½* "
Dec. *18*		*75* "
Jan. *18*	*56* inches	*75* "
Feb. *17*		*75½* "
Mar. *18*		*76½* "
Apr. *19*		*77* "
May *18*		*77¾* "
June *17*	*56½* inches	*78½* "
Total Gain for 9 months	*1½* inches	*5½* "

If the permanent record can be kept on a card about 5 by 8 inches, it may be used during all the grades of the elementary school.

3. Design and make a picture record of your own weight. On page 24 is shown a card which was made in one school. Your card should have space for recording weight at least three times each term. This card may be taken home after each weighing day.

4. Make a graph of your own gains in weight for a term, or for a year, like the " block " graph on page 26. Notice that each square or block represents a pound. A part of a square represents a part of a pound. At the right the expected gain for a year is shown, and the blocks in the last school month column show the gain during the whole time that the record was kept. Try to explain any losses in your weight and also unusually large gains.

Discuss These Problems in Class:

1. Decide why growth is an important sign of good health.
2. Explain the difference between growing in quantity and growing in quality.

CHAPTER IV

STRENGTH-GIVING FOODS

The First Thanksgiving.— The importance of "our daily bread" is emphasized in America by the holiday of Thanksgiving. This is a reminder of the early hardships of the sturdy pioneers who settled New England, and of their joy when the first harvests gave them the food they so much needed. These settlers had sailed from Europe in the *Mayflower* in August, 1620. They landed at Plymouth, December 21, and began to build their log huts in the wilderness. The cold and the hard work and the disease which broke out during the winter caused the death of nearly half of the one hundred two brave men and women.

In the spring, however, some friendly Indians helped the settlers who remained to plant and cultivate the native corn, so that they might have some food besides the fish they could catch and the small supplies they had brought with them. When the new crops were ripe in the fall, they had really enough to eat for the first time since landing.

Edward Winslow, one of the leaders of the Pilgrims, wrote to a friend in England on December 11, 1621:

"Our corn did prove well; and God be praised, we have a good increase of Indian corn, and our barley indifferent good, but our peas not worth the gathering, for we feared they were too late down. They came up very well and blossomed; but the sun parched them in the blossom.

THE FIRST THANKSGIVING

The Pilgrims entertained the friendly Indians at Plymouth in 1621, to give thanks for their first harvest in the new land.

"Our harvest being gotten in, our governor sent four men on fowling, that so we might, after a special manner, rejoice together after we had gathered the fruit of our labors. They four in one day killed as many fowl, as, with a little help beside, served the company almost a week, at which time, amongst other recreations, we exercised our arms, many of the Indians coming amongst us, and among the rest their greatest king, Massasoit, with some ninety men, whom for three days we entertained and feasted; and they went out and killed five deer, which they brought to the plantation, and bestowed on our governor, and on the captain and the others."

Some ten years later, a special Thanskgiving was held in Boston on the arrival of a ship from England with much-needed provisions; and when our Republic was established, Thanksgiving Day was made a regular national holiday by Washington. The actual day we now use—the fourth Thursday of November—was selected by President Lincoln. So the celebration of this harvest feast goes back through the time of the Civil War and that of the Revolution to the days when the Pilgrims gathered their first crop of good food in the form of Indian corn.

The story of Robinson Crusoe also impresses us with the importance of food. It tells us that the first thing Robinson Crusoe did after being shipwrecked was to seek for food. He found bread, rice, barley, and cheese on the wreck. On his desert island he hunted goats and gathered grapes. He planted barley so that he could raise enough to make bread. Crusoe knew that he would die on the desert island unless he managed to provide food for himself.

What Does Food Do for Us?—Why is it necessary for us to have food, and not only a certain amount of food, but foods of different kinds?

For breakfast today, John had an orange, a dish of oatmeal with cream and sugar on it, two slices of buttered toast, and a glass of milk. What did his body do with these various foods?

First of all, the body gets strength for the daily work of life from some of its foods. The commonest strength-giving foods are those which contain starch (like John's oatmeal and toast) or fat (such as butter) or sugar. We shall learn about the strength-giving foods in this chapter.

Secondly, we need foods, not only to give us strength to work and play, but also to help us grow. The starches, sugars, and fats alone would not do this. We must have a number of special building materials to make new bone and muscle and brain, just as a carpenter needs wood and nails and window glass and many other things to build a house. There are two especially important kinds of body-building foods. One of them includes the **protein** (prō′tė-ĭn) foods, which are found in milk and eggs and meat. (White of egg is a good example of a protein food.) The other important kind of body-building foods includes **minerals**, such as lime and iron, which are found in milk and fruits and vegetables. You will learn more about these growth foods in Chapter V.

Finally, there are substances in certain foods which do not give us strength, and are not built up into the organs of the body, but which are necessary to help us to keep healthy. If these substances are lacking, people suffer from certain diseases. These foods are therefore called protective foods. Their scientific name is vitamins (vī′tȧ-mĭnz). They are found in milk, fruits, and green vegetables; and we shall consider them in Chapter VI.

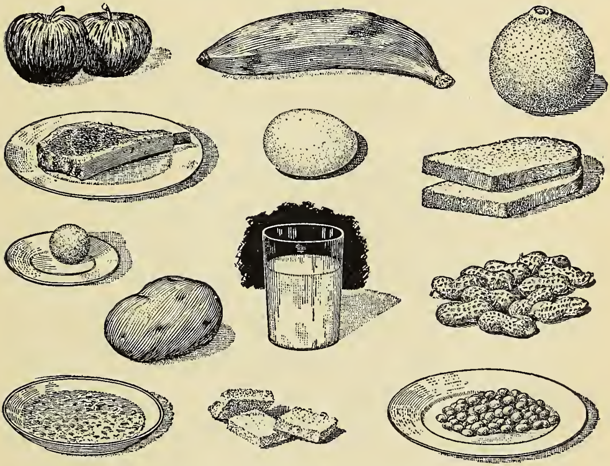
Milk is particularly fine food for a growing child, because it contains sugar, fat, protein, minerals, and vitamins.

The Strength-giving Foods.—Such a breakfast as John's, including one orange, one dish of oatmeal, two pieces of toast, and a glass of milk, weighs about one and a half pounds. One and a half pounds would usually be more than a month's gain in weight for a boy or girl of John's age. Since this is true, what becomes of all the rest of the food that John eats during a month? Strange as it may seem, most of our food is burned in the body. When wood or coal burns, it unites with a substance in the air called **oxygen** (ŏk′sĭ-jĕn), and this union between the wood or coal and the oxygen produces heat. When the coal is burned in an engine, it is the union with oxygen which supplies the energy or power to make the engine run. We found out in Chapter II that, in the body, the food plays the part of the fuel in an engine. Without the heat and the energy produced in the body from the food, all our signs of life would stop.

Some of these heat- and energy-giving foods could be used for fuel in an engine as well as in the body. A locomotive was once driven for ten miles burning nothing but dried milk! When your fingers become very cold, it is good to know that they can be warmed by the body heat under your arms. The formation of this heat in the body means that food is being used for the energy or strength to move about, to work, and to play. According to Aesop's fable, when the Hands refused to carry food to the Mouth, they soon began to suffer because they did not have strength enough to work even for themselves. It was from the fuel food that the Hands had unknowingly been receiving the strength to do their daily work.

If a boy who weighs 80 pounds always had to carry an 80-pound weight with him, he would think that it was hard work. Carrying his own weight, 80 pounds, is also work, but it is so easy he does not even know that he is doing it. If his body did not have plenty of fuel food, he would find that carrying his own weight was very difficult. Often a sick person who can eat little or nothing will say, "I can hardly drag myself around." If that person's body could talk, it would say, "Please give me some fuel food."

Fuel Foods for Work and Play.—There are men and women who study foods and find out just how much food, and what kind of food, your body needs. They know how to measure the amount of energy which food gives your body for work and play. A **calorie** (kăl′ȯ-rĭ) is a certain amount of heat energy. Some foods give us a great deal



FOOD PORTIONS CONTAINING EQUAL AMOUNTS OF ENERGY

Each of these portions will give the body about 100 calories of energy: an ordinary serving of beans, 3 lumps of sugar, 1 large banana, 11 double peanuts, 1 large egg, 1 potato, 1 small chop, 2 slices of bread, 1 large orange, 2 apples, ⅔ of a glass of milk, 1 pat of butter, and an ordinary serving of oatmeal.

of the energy which we need, while other foods give us only a little. The body can obtain 100 calories of heat energy from two small slices of bread or a medium-sized potato or an ordinary serving of oatmeal or any of the other food portions shown on page 35.

All foods which contain much starch are good fuel foods. Most seeds of plants contain a great deal of starch. The foods which are called cereals are made from the seeds of such grains as wheat, oats, rye, rice, and corn. The breakfast cereal which we eat every morning and the bread on our tables are both made from these grains. Beans, peas, potatoes, and some nuts are also fuel foods because they are rich in starch.

The cereals are the chief foods which give us energy. If we could gather together all the people of America and measure the energy they receive from food, we would find that one third of all the body energy of the American people comes from wheat, oats, and corn. Our central states, from the Appalachians to the Rocky Mountains, are largely devoted to raising these cereals, and you may travel there for miles and see scarcely anything but fields of waving grain. In the countries of Asia, such as China and Japan, rice and millet are the great cereal crops and the main fuel foods of the people. Breakfast cereals and bread and other foods made from wheat or corn or oats should be our chief source of body energy.

The foods which contain sugar are also classed as fuel foods. The sugar in the juice of beets and sugar-cane, and in the sap of the maple tree, is prepared for market by drying off the water of the plant juice and then purifying the sugar. The sugar in prunes, raisins, and other fruits remains in the fruits when they are dried. Honey and milk are sweet because they contain sugar. The body can use all these sugars as fuel when they are eaten in limited amounts.

FOOD FROM A FIELD

One third of all the body energy of the American people comes from the great wheat, oat, and corn fields of our central states.

The fats in foods form the third important

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source of heat and energy for the body. Eskimos and other people living in the frozen north, where the body loses its heat very rapidly, could never live without fat as a fuel food. Small amounts of fat are needed by everyone, but lumbermen and other active outdoor workers need a great deal of this fuel food. The most important of the fuel foods rich in fats are butter, cream, salad oil, bacon, fat meat, and most nut meats. Commander Byrd and other Polar explorers use meat which is canned in fat instead of in meat juice. This food is called pemmican. It is very convenient for Arctic travelers because even a small can of pemmican gives a great many calories of heat.

Other foods which do not contain much starch, sugar, or fat, such as meat and eggs, may be used as fuel by the body. The chief fuel foods, however, are the cereals, and milk, cream, and butter.

How Much Fuel Food Do We Need?—This is a difficult question to answer. It depends on your size, on how much you exercise while working and playing, and on the season of the year. Big boys and girls, of course, need more fuel than little ones. Boys and girls, big and little, when they work and play out of doors, need more sweet, starchy, and fatty foods than when they sit quietly and read or study. They need more in winter than in summer. If you are gaining regularly each month, as shown by your weight record, you may be sure that you are eating enough fuel food.

After Studying This Chapter

Check Yourself by Answering These Questions:

1. Why do our bodies need food?

2. What are the names of some foods which will supply our bodies with protein? Why does the body need protein?

3. Name two minerals which the body needs for building material. What are some foods which will supply these minerals?

4. Tell what you can about the body's need for strength-giving foods.

5. Why do some people need more fuel food than others?

Try One of These Suggestions:

1. Arrange pictures (class drawings if possible) to show a breakfast that you like. What fuel foods does it contain?

2. If you are keeping a Health Diary, write a day's record of the food you eat. Mark all the fuel foods with an " F".

3. From your geography book, find which is the favorite cereal grain of the Chinese. Of the Scotch. Of the Russians. Of the Americans. What is the second most important cereal used in each country?

4. Read about an Indian sugar camp in *Indian Boyhood* by Charles Eastman.

5. Make a " product map " to show the chief foods produced in your state.

6. Read about the food of the Pilgrims in your histories or in *Child Life in Colonial Days* by Alice Morse Earle.

7. Read about the food of Robinson Crusoe.

Discuss These Problems in Class:

1. Jack, who was ordinarily very active, broke his leg. He has to sit quietly day after day. What change would you suggest in his meals? Explain your suggestion.

2. During the World War in 1917 and 1918, there were posters all over this country with the slogan, " Wheat will win the War." Try to find out what this meant.

3. What were the fuel foods of the Pilgrims?

4. Decide how to classify the chief foods produced in your state under the headings (*a*) fuel foods, (*b*) body-building foods, and (*c*) protective foods.

5. Do growing boys and girls need much fuel food? How can they usually be sure that they are having enough fuel foods?

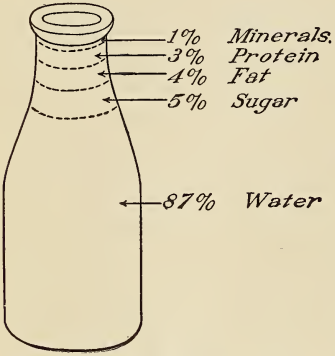
CHAPTER V

BODY-BUILDING FOODS

Milk, the Food for Growth. — Foods which give us strength to work and play are very important, but equally important are those foods which help us grow. Of all the growth foods, and there are many, milk is the most nearly perfect. Human bodies can take milk and make it into bone, muscle, blood, skin, hair, and teeth. The cleverest scientist cannot do this in his laboratory, but a tiny baby can in his own body. If a baby is gaining weight regularly each week, we know this miracle is happening. Milk must be the baby's building or growth food because it is his only food.

"Why is milk a growth food?" is a question that the food chemist can answer for us. First, however, he had to ask himself the question, "What is milk?" In examining a bottle of milk, the chemist took out the cream or fat; then the curd, the part of milk used for making cheese, which is one of the substances called proteins mentioned in Chapter IV; and next the sugar, which makes fresh milk taste sweet. This sounds simple, but separating the cream, protein, and sugar completely would look like a magician's trick to most folk. The chemist then took the water remaining, and from it he separated the minerals. When he had done this, he could show exactly what was in the milk bottle.

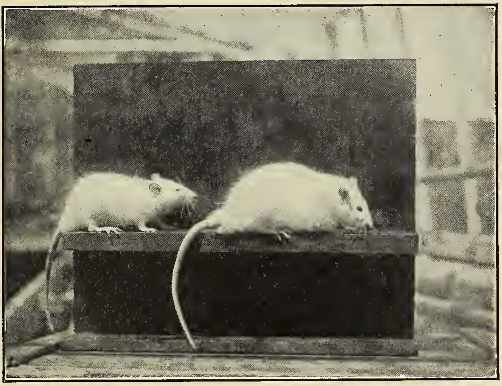
In the second part of his experiment, the chemist used his cream, sugar, protein, minerals, and water to make milk again. Some of the milk that he made had all its original parts; but from some milk he left out the cream, and from another portion he left out the protein. Some was made with minerals and some without. He was then ready to try to answer the question "Why is milk a growth food?" He mixed his different kinds of milk with bread and fed it to white baby rats. When the little rats had all the parts of cream, protein, and minerals, they grew rapidly. In one week they gained as much as a whole ounce in weight, their fur grew thick and soft, and even their tails were longer. Baby rats that had milk without protein



WHAT IS MILK?

This is what the chemist finds when he separates milk into its different parts. Which of these parts of milk are important as strength-giving foods? Which as body-building foods?

did not grow. Neither did those grow who had the milk from which minerals were omitted. The little rats' fur, their skin, their hearts, and other organs of their bodies could not grow. Not even their tails could grow without protein and minerals.



WHAT DIET CAN DO

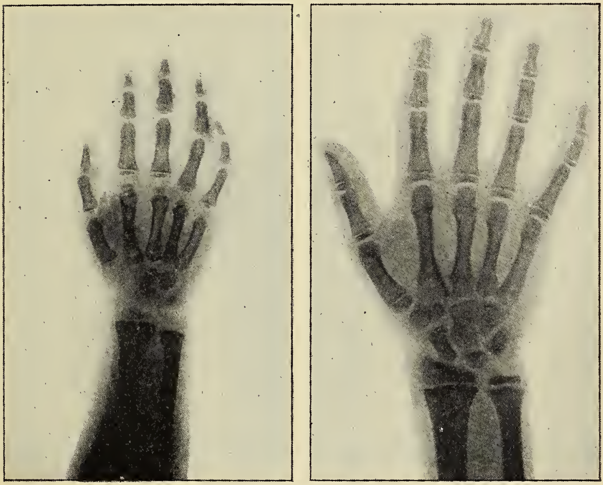
These rats were twins. The one on the left was given plenty of fuel food. The one on the right was given fuel foods and also minerals and proteins for body building. (*Courtesy of Professor L. B. Mendel, Yale School of Medicine*)

We know today that, besides the proteins and minerals, the watery part of the milk and the fat or cream contain the protective substances called vitamins. The amounts of these vitamins are far too small to show in the picture on page 42, but the rats needed these too for growth and health. After all his experiments, the chemist answered our question by saying, "Milk is a growth food because it contains proteins, minerals, and vitamins, which the body uses to build muscles and blood and teeth and all its other organs."

Protein as a Builder.—Other foods also contain protein, and as we grow older we eat many protein growth foods besides milk. Cheese, of course, is one of these foods; and eggs, meat, and fish are also important foods for growth. Many foods contain some protein, but much of it is not such good growth material as that found in milk. Beans, peas, and peanuts are rich in proteins, but the quality is poor; that is, these proteins cannot be used for body building unless the body also has some animal proteins, such as those in milk, meat, and eggs.

Protein is used for repairing as well as for building the various parts of the body. In case of an injury, protein is used by the body to build new skin that will repair cuts and burns. The body parts are always slowly wearing out, but all the time they are being rebuilt as fast as they wear out. Grown people, therefore, need protein for repairing their bodies; but children need it for growth as well as for repair.

Minerals Are Needed for Body Growth.—One of the reasons that milk and vegetables are very important foods is that they are rich in minerals. Three minerals are particularly important for the body. These are lime, phosphorus, and iron. A little lime is needed by all parts of the body, but a great deal is needed for building the bones and the teeth. Milk is the only food which can easily supply all the lime which the body needs. Most doctors agree that boys and girls usually should drink a quart of milk each day.



HOW YOUR BONES DEVELOP

These are X-ray photographs of the hands of two children, the one on the left three years old, the one on the right twelve years old. Notice that the bones of the young child are indistinct and have spaces between them where there is still soft material. In the older child the bones have developed and become sharp and clear. For the work of building bones, every child needs a quart of milk a day. (*Courtesy of Dr. W. A. La Field, Yale School of Medicine*)

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Phosphorus, as well as lime, is needed to build good bones and prevent certain diseases. Phosphorus is supplied by milk, eggs, and meat.

Iron is needed for making good blood. In order to do its work, the blood must have plenty of iron. Green leafy vegetables, eggs, lean meat, and some fruits will help to supply the body with iron.

Iodine is also an important mineral. Although only a tiny bit is needed, the body cannot grow without it. Much of the iodine in the world is in the salt water of the ocean. If everyone could live near the sea and eat fish and other foods from the ocean, everyone would have enough iodine. The people who study foods tell us that the drinking water and the vegetables near the sea contain more iodine than do those further inland. Many boys and girls who live in the states around the Great Lakes and as far west as the Rocky Mountains do not get enough iodine in their food. Such children suffer from a disease in which a gland in the front of the neck becomes enlarged. The doctor can generally cure this disease by giving the patient iodine.

Minerals, like proteins, are needed for body repairs as well as for growth. Each day the blood needs iron for repairs. When a bone is broken, the body needs extra lime to heal the break. The story of a patient with a broken collar bone which did not knit for nearly two years shows us the importance of lime. The patient had been eating meat, bread and butter, potatoes, coffee, and pie, none of them foods that contained much lime. Finally he was taken to a hospital where the doctor insisted that he have milk each day and also such vegetables as spinach, lettuce, onions, and carrots. In less than two weeks an X-ray picture showed that new bone was being formed at the break; and in less than two months the break was completely repaired.

Bricks for the Human House.—Milk, eggs, fruits, and vegetables are needed for building the body, just as wood and brick and plaster are needed for building a house. The strongest people are those who, like the Arabs in Western Asia, live largely on milk and fruits. Their country is a barren one. They have no great fields of grain as we have. But wherever they pitch their tents, they drive with them herds of goats and camels whose milk they use as we use the milk of cows. On the other hand, the natives of certain parts of southern India, who live largely on rice, are a poor and stunted race. White flour and hulled rice are good foods for fuel, but they are very poor building foods. Whole-grain cereals, like oatmeal and graham flour, are much better, since they contain protein, vitamins, and minerals as well as starch.

On the whole, however, it is best to eat starchy foods for fuel, and to use a little meat or eggs and plenty of milk, fruits, and vegetables for body building.

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AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. What is one reason why we are sure that milk is a body-building food?
2. What did the chemist find in a bottle of milk?
3. Explain how the little rats helped the chemist to prove that whole milk was a good growth food.
4. What are four kinds of foods from which the body can obtain iron?
5. What mineral is missing from the water and food supplies of some of our Middle Western states?

Try One of These Suggestions:

1. Plan a world tour to visit the people who use a great deal of milk. What animals supply their milk? Learn what you can about the general health and strength of these peoples.
2. Find out about the manufacture of cheese from milk. What part of the milk makes the cheese, and how is this part separated from the rest of the milk? U. S. Bulletin No. 11, *Milk and Our School Children,* in the Health Education Series will give you some help on these points. (Government Printing Office: 5 cents.)
3. Arrange to feed and care for some white rats. See pages 223–226. Weigh the rats regularly each week on gram scales for at least three weeks. Make a graph to show their gains in weight. Young rabbits, kittens, puppies, or chickens may be used instead of rats.
4. Collect and label samples of the minerals, lime, iron, and iodine. Lime can be obtained from a builder's supply company and iodine (crystals, not solution) from a drug store. Most nails are pure iron or iron oxide; a compound of iron and oxygen which we know as iron rust may be obtained from a drug store.

5. Make a poster to show the importance of drinking milk or eating fruits or vegetables every day. Make up a slogan, or motto, to tell people what they should know about such foods.

Discuss These Problems in Class:

1. Are body-building foods important for boys and girls who want fine bodies now and when they are older?
2. Is there any reason why some people may look quite healthy and yet not be strong?

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CHAPTER VI

VITAMINS AND SUNLIGHT

The Food Magic of Vitamins.—It is wonderful that bread and milk can be changed into human bone and blood and skin and nerves. As we learned in the last chapter, scientists have lately discovered some other strange things about foods—things that seem even more like magic.

These scientists have found that vitamins, as well as starch, sugar, fat, protein, and minerals, are absolutely necessary for the growth of children and young animals. They do not know just what vitamins do in the body, but they do know that in some way vitamins help children to grow. Vitamins also help to keep both children and grown people well. In Europe, during the World War, people who did not have enough food containing vitamins suffered from strange diseases. So we have learned to speak of vitamin foods as protective foods.

Captain Bering in 1741 set out with two ships to reach the strange, frozen countries near the North Pole. After five months of voyaging on stormy seas, when he was near the Aleutian Islands, the seventy men on his ship began to fall ill. The

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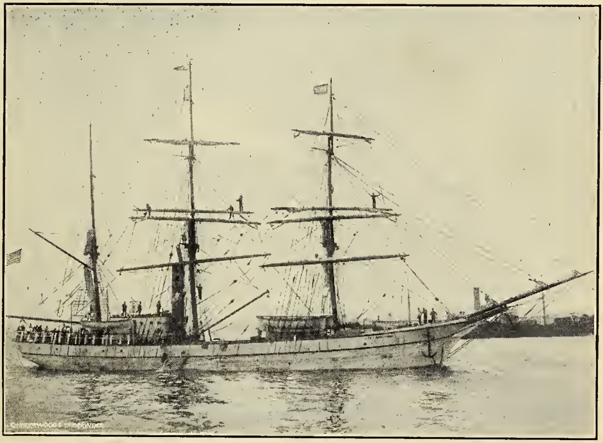
disease began with extreme weakness, "making the victims spiritless and indifferent to everything, preferring to lie down and die rather than to move about." Two deaths occurred, and at last Bering had to give up and return home with scarcely enough well men in his crew to sail the ship.



LOADED WITH VITAMINS

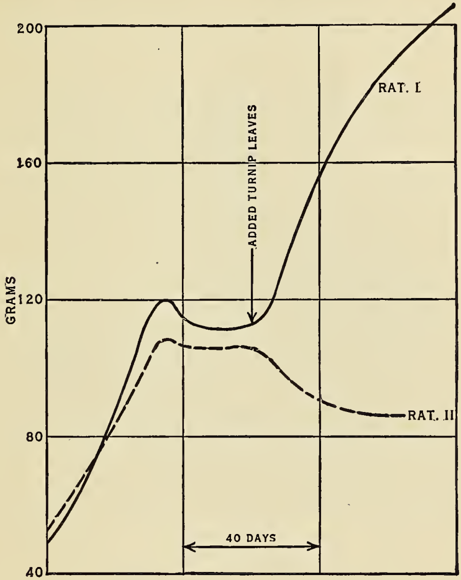
Commander Byrd's ship, the *City of New York,* on its trip to the Antarctic carried supplies which would give Byrd's men plenty of body-building and regulating foods. (*Underwood & Underwood*)

The disease from which these men suffered is called scurvy (skŭr′vĭ). We know today that it is caused by a lack of foods containing vitamins. So, when explorers now start on a long voyage, their supplies include green vegetables, fresh meat, and fruit juice or powdered oranges and lemons. Commander Byrd, when he sailed for the South Pole in the *City of New York* in 1928, carried a large supply of such foods. Bering's brave sailors would not have been sick if they had had the many kinds of protective food taken by the Byrd expedition.

The real truth about these protective foods has been discovered by feeding animals and then watching their growth and health. The graph on page 53 shows how twin rats differed in growth because the larger one had vitamins each day and the other did not. Both rats had plenty of protein, minerals, and fuel food. The value of vitamins from milk has been shown in the same way.

The people who fed these little rats learned that the one who had vitamins was almost never sick. The poor twin, who had no vegetable vitamins, not only failed to grow properly but was often sick, and he would try to bite or scratch even the person who fed him. Experiments such as this one have shown us that the vitamins dissolved in the water of milk, in the juices of plants, and in some fats, are necessary in order to keep people and animals healthy. Do you remember the cake labeled "Eat me" which Alice in Wonderland ate, and what it did to her? Milk and all green vegetables ought to be marked the same way, for their effect on boys and girls is almost as wonderful as that of Alice's cake.

Several different vitamins are now known. Fortunately, we do not have to remember what foods supply each special vitamin, because there are three kinds of food which will supply them all.



HOW VEGETABLES AID IN GROWTH

These lines show the growth of two baby rats. During the first 60 days of the experiment both were fed on the same diet, which included plenty of energy foods, protein and minerals, but lacked vitamins. For about 35 days both rats grew. Then they began to lose in weight. Rat No. 1 was then given green turnip leaves besides his regular diet. What happened? (*Courtesy of Dr. Georgia Burton*)

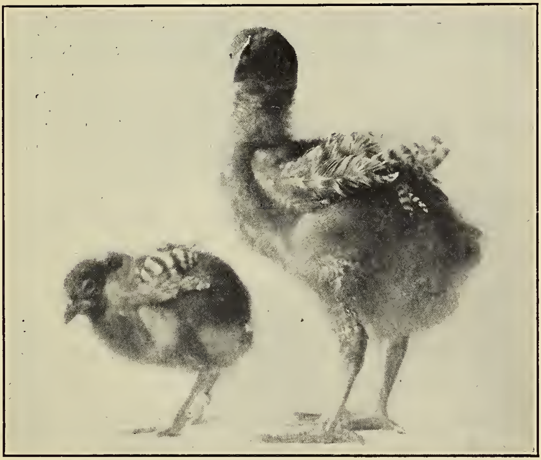
Eggs and whole grain cereals are valuable for certain vitamins; but we shall get all we need of all kinds if our daily diet includes milk; cream and butter; fruits, particularly oranges and grapefruit; and vegetables, particularly tomatoes and green leaf-vegetables, such as lettuce and raw cabbage.

Where Do Vitamins Come From?—Like protein, vitamins are made in the body of the cow which gives the milk, or in the plant which we eat as a vegetable or fruit. The cow gets the material to make her milk from the grass she eats. But where do the grass and the lettuce get their power to make vitamins and protein and starch? They get it from the energy in the rays of the sun. A plant grown in a cellar is white and sickly and limp. It cannot live without the light of the sun.

In this way all life on earth depends on the sun. Lately, however, it has been found that animals and boys and girls depend directly upon the sun for the power to make at least one of their own vitamins. Here is more food magic!

Sunlight helps us particularly to make the vitamin that our bodies need to help build fine bones and teeth. Boys and girls need a great deal of this vitamin, and so do babies. In countries where there is a long, dark winter, as in our northern states, children sometimes suffer from a disease called rickets, which makes the legs bowed and the teeth poor. In sunny lands, such as Porto Rico, there is almost no rickets.

Unfortunately, many of us live in countries where it is too cold to have long outdoor sunbaths during the winter; and sunlight through ordinary window glass cannot help our bodies make this all-important vitamin. The glass lets the light rays through, but it robs the sunlight of its power to prevent rickets. However, Nature has given us one food that is very rich in this vitamin—cod-liver



SUNSHINE HELPS TO MAKE VITAMINS

These two chicks are of the same age and have had exactly the same food. The only difference is that the one on the right has been given half an hour of sunshine every day. The sunshine helped it to make vitamins, and with the vitamins it could build big, strong bones. (*Courtesy of Dr. E. B. Hart, University of Wisconsin*) oil. The fish, although they live in the sea, away from the sunlight, can make this vitamin. In some countries of the far north cod and other fish livers are part of the daily diet. The oil is pressed from the cod livers, which are collected in great quantities by the fishermen and shipped to inland countries. Cod-liver oil is a food, not a medicine. Because this oil has the same power as the sunlight to help us make vitamins, it is sometimes called "bottled sunshine."

A trip around the world would show that the strongest, healthiest peoples are those who use plenty of protective foods. Almost all of them use many vegetables and a great deal of milk. In our own country, there are many cows to give milk and great farms to supply vegetables. There are protective foods enough for everyone to have plenty. It is the job of each one of us to see that we get our share. Gains on weighing day will help to tell boys and girls how well they are doing this job.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. Why are the foods which contain vitamins called protective foods?
2. What are some of the protective foods that Bering's sailors needed?
3. How did the little rats help scientists to prove that some foods contained vitamins?

4. What is the value of the vitamin which sunshine will help us to form in our own bodies?

5. What food could you call " bottled sunshine "?

Try One of These Suggestions:

1. Make a list of the foods rich in vitamins which were eaten yesterday by the class.

2. Tell which of the foods in the following meals are rich in vitamins:

Breakfast	Luncheon
Orange	Cream tomato soup
Oatmeal	Lettuce sandwiches
Toast	Milk
Milk	Gingerbread

3. Find how many of the class use " bottled sunshine."

4. Learn some of the rimes about foods from *The Child Health Alphabet* by Mrs. Frederick Peterson, published by The Macmillan Company. Here is one of them:

M is for Milk which
  Makes Muscle and Bone;
One quart a day
  Would be best till you're grown.

Make up some rimes of your own about foods containing vitamins.

Discuss These Problems in Class:

1. Tell the value of outdoor play, especially on sunshiny days.

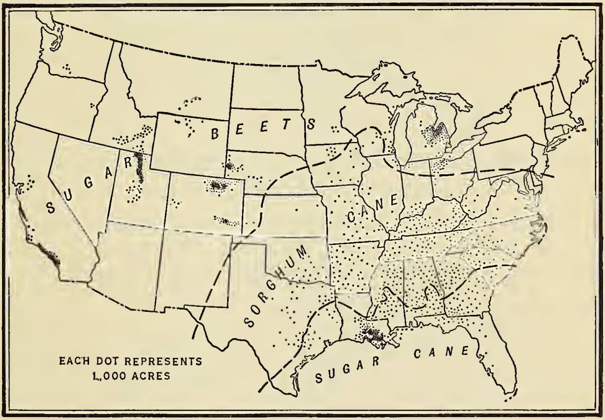
2. Are the members of the class all out in the sunshine practically every day for at least an hour, or are there times during the year when they ought to use cod-liver oil?

CHAPTER VII

THREE MEALS A DAY

Around the World to Choose Our Food.—The whole world helps to prepare our breakfasts. Men in Florida and Oregon have planted orange groves and apple orchards so that we might have fresh fruit. Others have cultivated oat fields in the Middle West; and still others have worked in the mills to prepare from the oats the cereals we need. Still others have grown the wheat and made the flour from which our bread was mixed. Sugar beets have been grown in Michigan, that our cereal may be sweetened, and dairy farms have been operated in many states, so that our glasses may be kept full of milk. Our cocoa may have been brought from South America and our rice from Japan on the other side of the Pacific. It is our problem to choose wisely from all these good things.

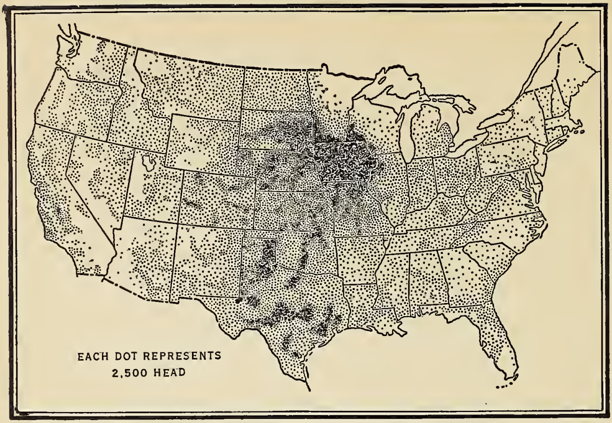
We have learned that the meals we eat should supply us with food for growth and repair, with fuel food, and with those magic foods called vitamins. The daily job of choosing three good meals must depend on this knowledge. The foods we choose form our diet. Robinson Crusoe's diet was the food which he provided for himself. If his meals contained the right kinds of food for repair, fuel, and health needs, it was an ideal diet. Our diet should do as much for us if it is to be ideal. First, we shall usually want two fuel foods for each meal. Cooked cereal and buttered toast are good fuel foods to choose for breakfast. Next we take milk, since it is one of our most important growth and health foods. One quart of milk a day is a good rule for every one of us.



WHERE WE GROW SUGAR

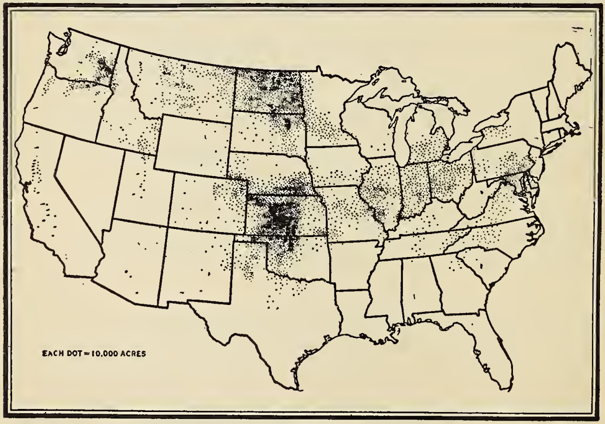
What three kinds of plants are grown for their sugar in the United States? Does your state produce any sugar? In which state is most of the sugar cane grown?

As a third part of our daily diet, we must add green vegetables and fruits, which should be eaten



WHERE OUR BEEF COMES FROM

What part of the United States raises the greatest number of beef cattle? Can you tell which states raise most beef?



WHERE OUR WHEAT COMES FROM

Which states raise the most wheat? How can you tell from the map whether or not your state raises much?

at least twice a day because they, too, are such important growth and health foods.

Oranges, grapefruit, prunes, and apples are perhaps the best fruits. Tomatoes, which some people call fruits and some vegetables, are excellent health food. Vegetables are of three kinds—root-vegetables like beets, carrots, onions, and potatoes; seed-vegetables, like peas and beans; and leaf-vegetables, like spinach, lettuce, cabbage, beet tops, dandelions, and chard. Of the root-vegetables, carrots are especially good. The leaf-vegetables are particularly rich in vitamins, and every boy and girl should eat some leaf-vegetable each day.

It is very easy to like all kinds of wholesome foods. Almost anyone can learn to eat them, just as almost anyone can learn to read or write. Some boys and girls who wanted to learn to like milk began by taking just a spoonful at each meal. After a week, they doubled the amount and took two spoonfuls. Soon they doubled the two spoonfuls, and then they doubled again and again. Finally they could not get along without a full glass of milk at each meal.

The same rule will help anyone who wants to learn to eat cereals or vegetables. Eat a small spoonful of the new food each time it is served. Soon you will feel cheated with less than a full serving. Usually it is best to take only a small portion of a new food, even if you like the taste.

That plan gives the stomach an opportunity to learn to like the new food.

Plan Your Meals For Every Day.—The following is a sample of a good diet for a school boy or girl. Perhaps you can learn to plan three meals a day for yourself or your family.

A GOOD BREAKFAST

Which of the things mentioned below can you find in this picture? Which of them are especially important as body-building foods? As fuel foods?

A Good Breakfast

1. Fruit (orange, prunes, banana, or apple)
2. Hot cereal, well cooked (oatmeal is good)
3. Dry toast and butter
4. Milk or cocoa

(A soft-cooked egg may be added)

A Good Noon Meal

1. Meat or fish or egg
2. Vegetable, such as spinach, cabbage, carrots, peas, or greens
3. Baked potato (with skin)
4. Bread and butter
5. Milk
6. Dessert, such as custard, fruit, or simple pudding

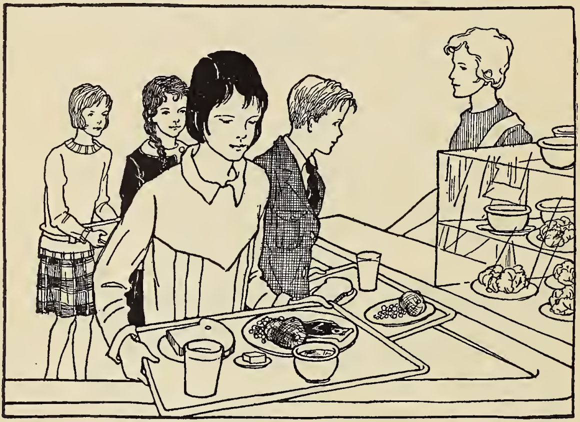
A Good Supper

1. Vegetable-and-milk soup or milk toast
2. Simple salad of fresh fruit or vegetable
3. Bread or crackers and butter
4. Baked apple or stewed fruit

The Ideal Diet.—The ideal diet is usually divided into three meals. In a later chapter you will find out why the stomach does not want food at other times. If the time between meals is long, a light lunch may be taken in the middle of the morning. Milk and a cracker or fruit make an excellent lunch.

The ideal diet does not contain pickles, pastry, candy, or highly flavored foods. Such foods spoil the appetite for cereals, bread, milk, and vegetables. When they do this, the body is cheated. Candy gives the body fuel, but nothing else—no protein, no minerals, no vitamins. The body usually gets plenty of the fuel foods, but often not enough of the growth foods or of the protective foods. If a little candy or other sweet food is eaten at the end of a meal, it will not cheat the body in this way.

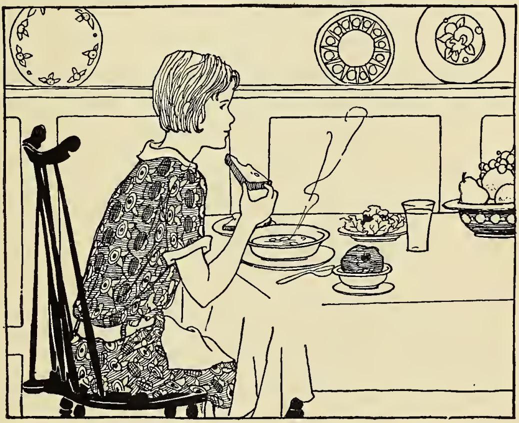
Tea and coffee are not found in the ideal diet for a child. Tea and coffee cannot give the body fuel or anything else it really needs (except for the cream or sugar we put into them). But tea and coffee may upset the digestion and harm the body by interfering with the work of the nerves, which act as controls for the body. Children who come to school with a breakfast of only bread and coffee are pretty sure to be underweight. The people who study foods once gave a little white rat coffee



A GOOD NOON MEAL

Can you tell which of the things mentioned on page 63 are on the trays? What should the boy add to his tray?

to drink. He drank coffee but no milk for three weeks. If that little rat could have talked, he would have told us that at first when he drank coffee he wanted to play all the time. Later he wanted to sleep all the time. Every day he tore the paper lining of his cage all to pieces. The third week he drank coffee he was very cross. He tried to bite and scratch the person who cleaned his cage. After that he had milk to drink. He was still naughty and cross for a few days; but soon he began to feel better, and after a week he was happy and friendly again.



A GOOD SUPPER

See which of the things mentioned on page 63 are in this picture. Which of them are especially important as body-building foods? As fuel foods?

Drink Plenty of Water.—Water is really a food, and a very important one. About two thirds of your body weight is made up of water. If a boy weighed ninety pounds, about sixty pounds of his body would be water. The body uses water along with proteins and minerals to make blood, muscle, brain, skin, and all its other organs. Fortunately, water is part of nearly all the foods we eat. Leafy vegetables, fresh fruits, milk, and even dried fruits, rice, sugar, and flour contain some water.

The amount of water necessary to supply the daily needs of your body, besides the water contained in solid foods, depends on the other liquids you take and on the amount of water you lose as perspiration. Doctors usually suggest from four to eight glasses of water as a daily portion. Five or six glasses a day for boys and girls of your age will probably supply your bodies' needs.

When You Buy Food.—There is one thing you always want to remember as you go into the store or market and help to buy your own food—be sure to choose clean food. Later on you will learn the best ways of keeping food clean. If you happen to buy food in a store or restaurant, be sure to choose a place that keeps clean food. It is a safe rule never to buy meats, butter, bread, or candies that have been exposed to dust or dirt. Such foods should be kept in glass cases. An apple or any other fruit should be washed before it is eaten. It is wise, too, to find out something about your milk supply—where it comes from, and how it is kept clean and made safe for you to drink.

Food is one of the chief things for which a family's earnings must be spent. In many families, a certain amount of money is set aside each week or month to pay for food. This is called the food budget. To secure a good, inexpensive diet for the family, it is well to spend about one quarter of the food budget for milk, one quarter for vegetables and fruits, one sixth for bread and cereals, one sixth for meat, fish, and eggs, and the rest for sugar, butter, and other foods.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. Define the word *diet*. What is meant by an ideal diet?
2. What three kinds of food should we expect to find in an ideal diet?
3. Why is it important to like all kinds of wholesome foods?
4. Why are tea and coffee not found in an ideal diet?
5. Why is water really a body-building material?
6. About how much water is needed each day by boys and girls of your age?

Try One of These Suggestions:

1. Examine the meals recorded in your Health Diary for a day. How many fuel foods did your meals contain? How many of them were rich in starch? In sugar? In fat? How many of your foods contained protein? Minerals? How many of the foods would you class as protective foods

because of the vitamins they contain? How many servings of fresh fruits and vegetables did you have?

2. Make a map to show the location of the dairies, farms, orchards, and factories which furnished the foods for your day's diet. If you planned to visit them, would you have to travel outside your own community, state, or country?

3. Plan a day's meals for a family living in the country. If possible, use only those foods which can be grown on a farm. Must any food material be bought to make the diet an ideal one?

4. About how many pounds of water are in your own body? If it were measured as liquids usually are, how many gallons of it would there be? (One gallon of water weighs about $8\frac{1}{3}$ pounds.)

5. Study a list of foods sold at the school lunch counter or at some restaurant or cafeteria. Make menus from this list for cheap and well-balanced meals.

6. Write a short play with Milk, Cereals, Carrots, Tomatoes, Spinach, Lettuce, Oranges, and other foods as the characters. Have them tell what they can do to make children healthy. Coffee, Tea, Candy-between-Meals, and Pickles might appear as villains.

Discuss These Problems in Class:

1. Could you plan an ideal daily diet from Robinson Crusoe's foods? What would it contain? Would any important food or food element be lacking?

2. Let each pupil plan a school lunch to be carried from home. Have someone collect the papers, which should not be signed, mix them, and hand them out again. Then discuss at least some of the lunches planned and decide whether they are part of an ideal diet.

CHAPTER VIII

HOW OUR BODIES USE FOOD

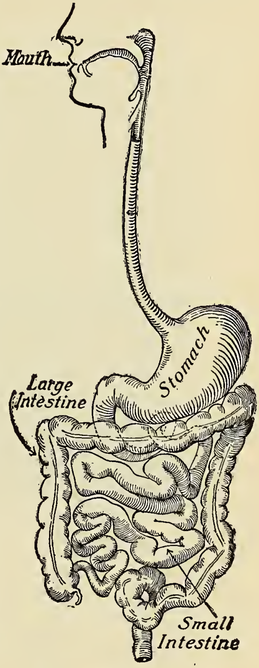
What Happens to Food in Your Body?—Hunger is the signal given by your stomach when it is ready for a meal. Nobody can be more alive than boys and girls who have received the hunger signal. How good food usually tastes when we are really hungry! If the hunger signal is given before the time for a regular meal, drinking a glass of cool water will usually prevent hunger pains until the time to eat. Sometimes the thought of fried chicken, the odor of gingerbread, or the sight of candy can make your mouth "water," even when your stomach is not ready for food. This is a false signal, which may tempt you to eat food not really needed; and as a result the stomach may be overworked.

We have discovered that our bodies need food for growth, for strength, and for health. How does the body change the food into muscle and blood and bone? The first step in this process is digestion.

When we swallow our food, it passes into a long food tube which has five chief parts, as shown on page 71. They are: first, the mouth; then a long section of tube running from the mouth to the stomach; then the stomach itself; next the **small intestine** (ĭn-tĕs′tĭn); and finally the **large intestine.** Before the food can be used by the body, it must pass through the walls of the food tube into the blood. In order that it can do this, it must be changed into a liquid form. This process is what we call **digestion.** It is brought about by the action of the digestive juices, which are liquids prepared in the walls of the food tube and in special organs connected with it. These liquids have the power of changing the foods in such a way that they can be passed through the walls of the tube and taken into the blood.

Digestion in the Mouth.—Digestion begins in the mouth. First of all, the food is broken up and softened by the action of the teeth. Secondly, it is mixed with a digestive juice called **saliva** (sȧ-lī′vȧ), which comes from glands below the cheeks and under the tongue. (It is these glands which swell and become sore when children have the mumps.) The saliva changes the starch in food into sugar, which dissolves and can easily be taken into the blood stream. We can observe the work of the saliva if we chew a piece of bread very slowly and thoroughly. After a while, it begins to taste sweet, because the starch has been changed to sugar.

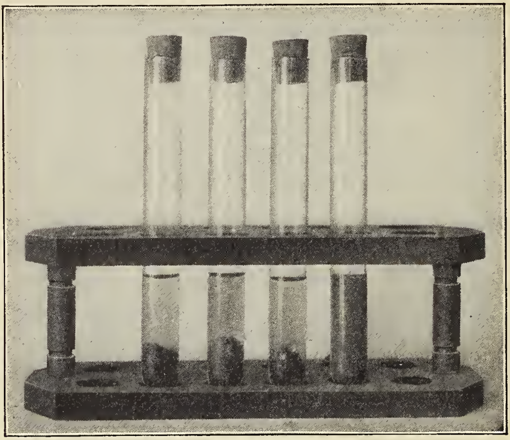
It is very important to chew the food thoroughly before it is swallowed, if the rest of the digestive system is to be kept in good working order. The stomach is meant to digest soft, well-chewed pulp; and if solid food is forced down in lumps, there is likely to be trouble. We remember from Aesop's fable, which we read in the second chapter of this book, how the stomach depends on the other organs of the body to help it in its work. Another reason, though a less important one, for thorough chewing of food, is the fact that it tastes much better and we enjoy it more if it is eaten in this way.



THE PARTS OF THE FOOD TUBE

In which of these parts are digestive juices formed?

Digestion in the Stomach.—From the mouth, the food passes down through a long, slender tube into the stomach; and here the work of digestion goes on further. The stomach is so large, in comparison with other parts of the food tube, that it serves as a sort of storehouse for food. We need such a storehouse because the food eaten in large amounts at mealtimes must be digested slowly. It passes gradually from the stomach into the intestines. But though the storehouse is large, it cannot store too large a meal without making trouble.



THE WORK OF THE DIGESTIVE JUICES

A piece of meat and some water have been placed in each of these glass tubes. To the first tube (from left to right) nothing else has been added; to the second, hydrochloric acid; to the third, pepsin; to the fourth, both hydrochloric acid and pepsin. In the first three tubes, no change has taken place. In the fourth, the meat has been dissolved so as to color the whole of the liquid. See pages 73 and 77.

In the walls of the stomach there are strong muscles. These muscles, by contracting, move the walls of the stomach and keep the food moving round and round so as to change it into a thin paste. At the same time, more digestive juices are added to the food, particularly the kind of juices that dissolve the protein of meat, as shown in the experiment on page 77. When an empty stomach contracts, we get the hunger signal which tells us that the stomach muscles need something on which to work.

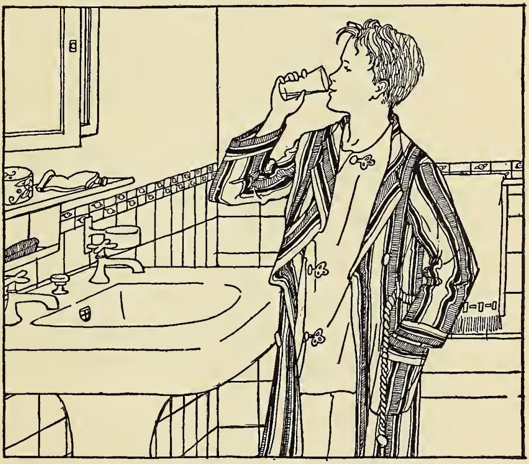
Digestion in the Intestines.—The food mass on which these juices have acted is squeezed out from the stomach into the small intestine. The last of the food taken at an ordinary meal passes out of the stomach and into the intestine about four hours after it is eaten. Finally, digestion is completed in the small intestine. This is a long tube, coiled round and round in the lower part of the trunk as shown in the figure on page 71. The food is gradually squeezed along through this intestine by contractions of its walls, somewhat as we squeeze tooth paste out of a tube. It often takes twenty hours for the food to pass through the small intestine.

In the small intestine, the food mass is mixed with more digestive juices. Some of these juices come from the walls of the intestine itself. Some come from two organs, the **liver** and the **pancreas** (păng′krė̇-ăs), which pour them into the intestine through small tubes. These juices digest the fats and finish the digestion of starches and proteins. By the time the food has passed through the small intestine, most of the digestible matter in it has been changed into a liquid form. All the sugars, fats, and starches, all the proteins and minerals which the body can use, are now dissolved. In this form, they pass through the walls of the small intestine into tiny blood vessels, many of which are imbedded in these walls.

When the digested food enters the blood, it has really started on its way to supply the bones, the muscles, the nerves, and all other parts of the body with their daily food supply. Soon it will be used as fuel food and as building and repair food by the different body parts.

When the small intestine has finished the work of digestion, there usually remains a quantity of moist, bulky material, which passes into the large intestine. Some of the water in this bulky material goes into the blood through the walls of the large intestine, and the rest remains as waste which the body must get rid of. The movement of this waste from the large intestine, or bowel, usually occurs daily. Drinking plenty of water each day and eating vegetables, fruits, and whole grain cereals help to keep the food tube clean and active, so that the waste material is regularly and promptly removed from the body.

How You Can Help Digestion.—A cool bath for the stomach and intestines is an excellent morning habit. You can give them such a bath by drinking a glass of water as soon as you get up. Almost immediately after drinking a glass of water, the muscles in the walls of the stomach and intestines will begin to contract and relax, and when this activity reaches the large intestine, the contractions help to move out the wastes. Vigorous daily exercise also helps the food tube to do its work of getting rid of waste. Careless or lazy people, who do not have regular toilet habits, often become constipated; and then they use laxative medicines which force the waste from the intestine. Soon the intestine walls become flabby and fail to do their work without medicine. Later, even larger doses of medicine fail to help.



THE EARLY MORNING DRINK

Drinking a glass of water when you first get up in the morning is one of the best ways of keeping the food tube clean.

A food tube which is not kept clean may lead to serious difficulties. If the waste remains too long in the large intestine, it may decay and form poisons which pass into the blood and are carried to other parts of the body. Also the pressure of the waste in the large intestine leads to headache and discomfort. A movement of the bowels at least once a day, and at a regular time, is one of the most useful health habits that can be formed.

We have mentioned the false signals of hunger that may deceive us when we smell or see food that is attractive. These are very useful signals if they come at regular mealtimes when the stomach itself is calling for food. When your mouth "waters," it means that the saliva is flowing; and if you take time to enjoy your food, there will be more good juices to digest it.

Even the movements of the stomach are affected by your state of mind. By the use of the X-ray, we can take photographs of the stomach right through the body and study its movements. Dr. Cannon of Harvard showed by such pictures that when a cat was petted, its stomach worked well; but when the cat was frightened or angry, the movements would stop. This is why a cheerful, pleasant frame of mind helps to make digestion easy. Mealtimes should be times for pleasant talk and leisurely enjoyment, not for the hurried snatching of a bolted meal.

It is particularly important not to exercise violently or to take a bath within half an hour after eating. If you do either of these things, the blood will be drawn into the skin, and the work of digestion will not go on properly.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. How does the stomach signal when it is ready for a meal?
2. What three parts of the food tube supply digestive juices?
3. How is starch changed by the saliva?
4. Give at least two reasons why the small intestine is important as an organ of digestion.
5. How may the food tube be kept clean?
6. How do eating habits affect the digestion?

Try One of These Suggestions:

1. Have someone bring from home the gizzard of a chicken that has been cleaned. What are its walls like? To what part of your body does it correspond?
2. Show the action of digestive juices by the following experiment: Take four glass test tubes or small glasses; half fill one with plain water, one with a solution of pepsin, one with two-per-cent hydrochloric acid, and the fourth with a solution containing both the pepsin and the acid. You can get both pepsin and acid from the drug store. Pepsin is made from the digestive juice of a calf's stomach; and both pepsin and acid are found in our own digestive juices. In each tube place a piece of meat. After the tubes have stood for half an hour in a warm place, the meat in the first

three tubes will look just as it did at the beginning, but the meat in the tube containing both pepsin and acid will look cloudy and soft, and the liquid will be discolored. This shows that the meat is being dissolved, or changed into liquid form, by the digestive juice.

3. The following habits help to keep the food tube in good working order. Copy them into your Health Diary and mark the ones which you practiced yesterday. If necessary, plan to improve your habits.

Drink a glass of water the first thing in the morning.
Drink four or five more glasses of water during the day.
Have a regular time for the morning bowel movement.
Eat some fruit at least once a day.
Eat vegetables, other than potatoes, at least once a day.
Eat a whole-grain cereal or bread every day.
Have an hour or more of vigorous outdoor work or play each day.

Discuss These Problems in Class:

1. Why is it important to have regular mealtimes?

2. Why is eating between meals usually a bad habit? (A simple mid-morning or mid-afternoon lunch may be considered a fourth meal if it does not spoil your appetite for the noon or evening meal.)

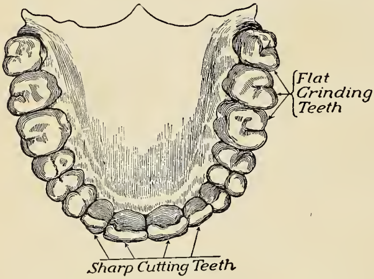
CHAPTER IX

STRONG AND BEAUTIFUL TEETH

Good Food Builds Strong Teeth.—The teeth are useful because they begin the work of digesting our food. They are beautiful if they are well-shaped and even and bright and clean. A fresh, clean mouth and a fine, shining set of strong teeth are among the things that attract us most in some new person we may meet. A model set of food grinders should be the proud possession of every one of us. Unfortunately, many of these grinders are not properly built and do not receive proper care. As a result, they cause us pain, trouble, and expense.

The condition of these grinders depends first and foremost on the food we eat while we are children. The immigrants who come to this country from certain parts of Europe have splendid sets of teeth. So do their children. But after these children have lived here for a few years, their teeth decay. What is the reason? Simply that at home these people lived on farms where they drank plenty of milk and ate plenty of green vegetables. When they come to our cities, they forget these good habits and try to live on white bread and meat. Their bodies no longer get the lime they need for building good, strong grinders.

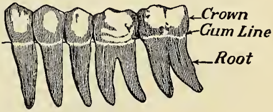
Our Two Sets of Teeth. It is particularly important, of course, that babies and young children should have plenty of lime for tooth making. They must, as we know, make two complete sets, one for use while they are little, and the other for the rest of their lives. The tiny baby's milk, his fruit, and his vegetable juice supply lime and vitamins for building the first teeth. For several months a baby's teeth are out of sight under his soft, red gums; but about the sixth month some of them are large enough to push through. After that, his teeth continue to grow out until, at about two years, he has twenty—a full set of baby teeth—equal in number to his fingers and toes. These are the teeth a child uses till he is more than five years old.



THE SECOND SET OF TEETH

Look in a mirror and see how many of these teeth you can find in your own mouth.

At about the age of six years, the first teeth begin to loosen and come out. Soon after one of the first teeth drops out, a tooth of the second or permanent set grows out in its place. All the while the baby teeth are being used, the second set of teeth are developing underneath them, growing larger and harder. At last they are ready to come through the gums in their turn, pushing the temporary teeth out before them. They will grow to be fine and strong if they have the lime and other building materials from a quart of milk and some fruits and vegetables each day. There are thirty-two of the permanent teeth, and most of them grow out between the ages of six and twelve. The last four teeth sometimes appear when a person is twenty years old or more. They are called the wisdom teeth.

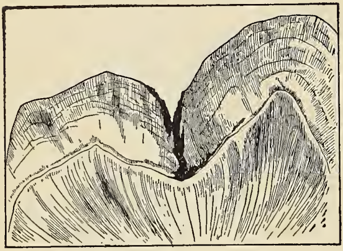


THE PARTS OF THE TEETH

What foods do you need to build your teeth strongly and well?

Usually the first of the second set to come through the gums are teeth called six-year molars, which appear just back of the last baby tooth. Some people do not know that they are permanent teeth and that they should be given especially good care. The six-year molars are most important and should be useful from six to sixty years and even longer. If these six-year molars, or grinding teeth, are lost, the later teeth often come in crooked. This spoils the appearance and usefulness of the teeth and the shape of the mouth.

The part of the tooth that we see in the mouth is called the **crown.** It is covered with a very hard smooth substance, called **enamel.** Beneath the surfaces of the gum are the **roots,** which are pointed prongs, one, two, or three to each tooth. The roots, which are shown on page 81, hold the teeth in place, somewhat as a root holds a plant firmly in the ground. The crown of the tooth is mostly hard, dead matter, but in the roots there is soft pulp containing blood vessels and nerves. It is through these blood vessels that lime and other building materials from digested food reach our teeth.



DANGER AHEAD

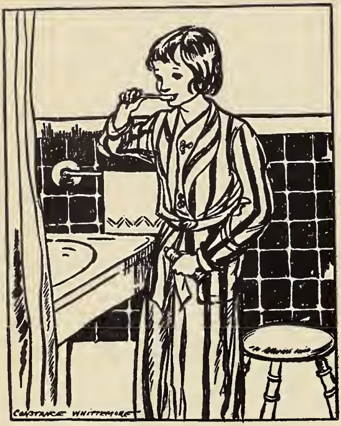
A tiny break in the enamel, which would hardly show in the tooth itself, can be plainly seen in this picture of the tooth's cross-section enlarged to many times its real size. Notice how decay has already begun. What can be done to stop it? (*Courtesy of Professor C. F. Bodecker, Columbia University*)

Decay and How to Prevent It.—The enamel covering of a tooth is built of tiny sections just as a brick wall is built of bricks. And just as there is a hole in the brick wall when a brick is missing, so, if we do not have plenty of foods containing minerals and vitamins, there are often tiny holes in the enamel covering of the tooth. It is in these tiny holes in the enamel that bits of food spoil and finally cause the teeth themselves to decay. The decay is caused by very tiny living things called **bacteria**, which you will learn about later on. Boys and girls who go to their dentist twice a year give him a chance to find where sections of the enamel are missing. The tiny holes are too small for us to see, but the dentist can find them. If he cleans and fills these tiny holes, decay of the teeth may be prevented for many years. Boys and girls who have this service never doubt that the dentist is their friend.

If decay nears the pulp of the tooth, the nerve becomes sensitive; but if decay reaches the pulp itself, the tooth usually has to be pulled. This is because the blood in the pulp of the tooth may carry poison from the decayed material to the heart or other parts of the body, where it often causes trouble.

Keep Your Teeth Clean.—The appearance of well-built teeth depends on their cleanliness quite as much as on the way they were built. There are two ways of helping to keep your teeth clean. One is to eat foods which give the teeth plenty of exercise. Such foods as raw cabbage, celery, lettuce, apples, hard toast, and crusts all give the food grinders lots of work. A generous portion of one or two of these foods in each meal will help to keep the teeth clean.

The second important way of helping to keep your teeth clean is by the proper use of a proper toothbrush at the proper times. A proper brush is small enough to be moved easily between the teeth and the cheek. It is also stiff enough to clean the grooves between the teeth. To use a toothbrush properly, you must hold it in the position shown in the picture, press the bristles firmly against the teeth, and give the brush a slightly rotary (round and round) motion. When all the outside surfaces have been well cleaned, the inner surfaces should be treated in the same way. Teeth should be brushed thoroughly on the tongue side and on the cheek side, as well as on the tops, until they feel clean and look clean. It is easy to form the daily habit of brushing the teeth, if you like the feel and the appearance of clean teeth.



HOW DO YOU BRUSH YOUR TEETH?

At least twice a day, morning and night, your toothbrush should be used as described on this page.

It is a good plan to use paste or powder on the toothbrush at least once a day. Druggist's chalk is good for this purpose and has the advantage of being very inexpensive.

Your tongue and gums, as well as your teeth, should be thoroughly cleaned. After you have finished the brushing, rinse your mouth several times. You can do this by forcing water between and around the teeth with the aid of the lips and tongue.

Teeth which are badly stained or covered with the substance called tartar must be cleaned by a dentist. A visit to the dentist twice a year will give him a chance to do this cleaning as well as to mend any tiny cracks in the enamel.

After you have used your toothbrush, rinse it well and hang it up in a dry place. Of course you will never use a toothbrush belonging to someone else.

What is the proper time to brush the teeth? It is best to brush them after each meal, so as to remove any bits of food just as soon as they have collected. If you cannot always do this, you should brush the teeth at least twice a day, night and morning.

The Brushes' Quarrel.—One little girl found out the importance of the toothbrush when she dreamed about the brushes' quarrel. In her dream, she was waked up one night by a noise of voices in the kitchen. It seemed to her that she pushed the kitchen door open softly, and that this was what she saw and heard.

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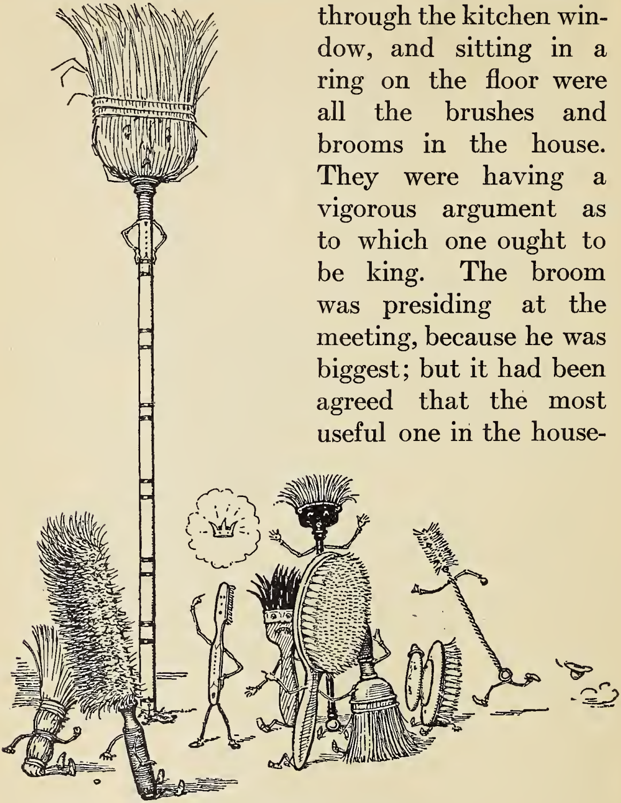
The moonlight was streaming quite brightly through the kitchen window, and sitting in a ring on the floor were all the brushes and brooms in the house. They were having a vigorous argument as to which one ought to be king. The broom was presiding at the meeting, because he was biggest; but it had been agreed that the most useful one in the household ought to be king, and each was presenting arguments as to why he was that one.



THE BRUSHES' QUARREL

Should the toothbrush be king of all the brushes?

The hearthbrush declared that ashes from the fireplace made more dirt in the house than everything else put together, and that his work of keeping them back on the hearth and preventing them from being blown about was the most important thing a brush could possibly do.

Mr. Broom, the chairman, put in his word. "There is nothing at all in the Hon. Mr. Hearthbrush's claim." The broom was always very formal and polite. "The open fires are lighted only in certain rooms and at certain times, but there is dirt in the house always and everywhere. I am the one who has to keep it clean from attic to cellar, in July as well as in January, and my work is therefore most important of all."

The bottlebrush and the sinkbrush applauded this by rubbing their bristles against each other; but the clothesbrush jumped into the center of the circle, very much excited, and gave the discussion a somewhat new direction. "It is true that Temporary Chairman Broom probably moves more dirt in a year than all the rest of us put together," he said, "but I claim it is quality of work, not quantity, that ought to count. Mr. Broom is trusted for the heavy work of cleaning floors and stairways, but when the members of the family want a really good job done, when they want the clothes they wear to be spic-and-span, they call on me."

"There is a great deal in what Brother Clothesbrush has said," interrupted a handsome, silver-mounted hairbrush, "but his argument counts much more for me than it does for himself. The clothes are more important than the carpets; but the head is more important than the clothes, and I have by far the greatest work of all to do."

There was silence for a moment, and it looked almost as if the hairbrush would carry the day. Suddenly a tiny little figure ran out into the moonlight, and a high, squeaky voice cried out, "Wait a bit, wait a bit, until you have heard a plea from me, the Toothbrush. The clothes are more important than the carpet, and the head than the clothes, I agree. But the inside of the head is far more important than the outside.

"If Mr. Clothesbrush or Mr. Hairbrush is neglected," he went on, "our masters and mistresses will look untidy, but they will not get ill; while if I were not used, there would be toothache and misery and illness as a result. I am the one who ought to be king of the brushes."

There was a great hubbub and noise, some taking little Mr. Toothbrush's side and some opposing him. Just then the dreamer woke up and never knew who was finally chosen king, but she had her own ideas on the matter and felt sure that the honors belonged to Mr. Toothbrush.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. What are two reasons why our teeth may cause us pain, trouble, and expense?
2. What two materials are of special importance for building good teeth?
3. When do the first of the permanent teeth usually appear in the mouth? What name is given to them?
4. Tell two methods of helping to keep the teeth clean.
5. What causes toothache?

Try One of These Suggestions:

1. Have each member of the class use a copy of the following form to score his own mouth:

My Mouth	Perfect Score	Own Score (1)	Own Score (2)	Own Score (3)
TEETH, No tartar, stains, or bits of food	20			
No cavities or abscesses	20			
All six-year molars present and in good repair	20			
No empty spaces in jaws	10			
TONGUE, Clean and pink	10			
GUMS, Clean, firm, and pink	20			
Total Score	100			

2. Help little brothers and sisters to like a clean mouth; to use a toothbrush properly and regularly; to drink milk and to eat vegetables; and to chew food thoroughly.

3. Read *A Child's Book of the Teeth* by Harrison W. Ferguson, published by the World Book Company.

4. Write "The Diary of a Grinder Family." Tell the amount of milk they had to help make them grow; how they used this food; the ages of various members of the family; their work, cleanliness habits, and accidents.

5. Notice the difference between the teeth of a dog or a cat and those of a horse or a cow. What relation is there between the kind of teeth and the kind of foods which these animals eat? What different kinds of teeth have you?

6. Dramatize the story of the brushes' quarrel.

Discuss These Problems in Class:

1. Decide exactly how teeth should be brushed to keep them clean. It may be well to have someone show the proper way of brushing teeth or to have a toothbrush drill.

2. Is it possible for the members of your class to have plenty of tooth-building material and especially of the bone- and tooth-building vitamin which can be formed in our bodies by sunshine? Give reasons for your answers.

3. Do grown people need lime and vitamins to help keep their teeth in repair?

CHAPTER X

THE BREATH OF LIFE

The Air We Breathe.—When someone asks, "What are you doing?" you often answer, "Nothing." That is not quite accurate. There are some things you are doing all the time, and one of the most important of these is breathing.

In and out, in and out, the air goes, every minute of the day and night, whether you are working or playing or sitting still or asleep in bed. With a watch on the table, you can count the number of breaths you take in one minute. You can then multiply the number by sixty to see how many times you breathe in an hour, and multiply that product by twenty-four to see how many times you breathe in a day.

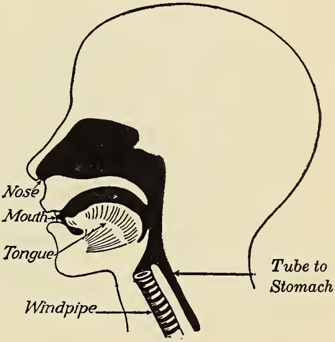
Good air is colorless, tasteless, and odorless, and yet we speak of it as the breath of life, for we could not live without it. In the same way we might speak of food as the food of life, and water as the water of life, although men have managed to live for a month or more without food and for several days without water. If, however, we did not have air to breathe for even a few minutes, our bodies would cease to show any of the signs of life. This is not because air is more important than the food and water, but because the body can store some food and water within itself; while a good air supply depends on every breath.

Body heat, which we mentioned in connection with fuel food, is produced in the body when the body has both fuel food and air. The warmth of our bodies is a sign that they are using food and air to give the energy for heartbeats, for breathing, and for all other body movements. Although our air supply cannot be stored for future use, Nature has provided our world with great quantities of air—many, many times as much as we need—so that our job of supplying air to our bodies is usually an easy one.

Not only is our air supply generous, but it moves constantly. Rapidly moving air, according to our geographies, is wind, and gently moving air is breeze. Very gently moving air cannot move curtains at a window, but it can carry perfume to our noses, and it can also carry food odors from a distant kitchen to all parts of the house. Winds and breezes, and even very gently moving air, all help to bring us a fresh air supply, which we take into our bodies by constant and regular breathing.

As we have already found out, the special part of the air which we need for the work of our bodies is called oxygen. Whenever anything burns, it is this gas, oxygen, which is at work. If a candle flame were covered with a tight glass jar, the candle would go out as soon as it had used most of the oxygen of the air inside the jar. For all the activities of our bodies, we need oxygen, just as the candle flame does.

The more we learn about oxygen, the more we feel that it is almost like one of the good fairies in the story books. We cannot see it, but it is everywhere about us. Whenever we strike a match or light a fire, oxygen is at work making the flame burn. The fire of logs around which some band of travelers gathers for warmth in the frozen north, and the great blast furnaces of Pittsburgh, in which steel is made for mighty ships and engines, owe their heat and their power to oxygen. It is oxygen which makes possible the life of every living thing, from the green slime on the bark of a tree to the tree itself, and from the tiniest insect to the elephant or man.

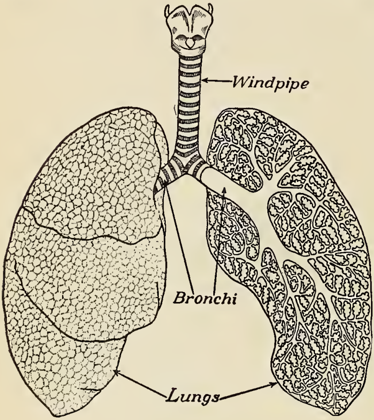


THE GATEWAY FOR THE AIR

The air we breathe should come in through the nose (not the mouth) to the windpipe. To see where it goes next, look at the figure on page 94.

Where does the air go which we breathe in so many times a minute? The diagrams on page 93 and on this page will show us.

Your Air-receiving Stations. — The nose and throat, of course, act as the first air-receiving station. The air, drawn in through the nose, passes first into the upper part of the throat; for the nose opens into the throat, as shown by the picture on page 93. From the lower part of the throat are two openings. Through the opening at the front, the air is drawn into the **windpipe.** At the back of the throat, there is an opening into the foodtube by which food passes to the stomach. The windpipe, as shown in the figure, runs down a little way, then divides into two branches, called **bronchi** (brŏng'kī), which lead to the **lungs.** It is through the nose, throat, and windpipe that the air we breathe passes down into the lungs.



THE LUNGS

The whole lung is shown at the left. The lung at the right is cut in half to show the tiny air chambers where the oxygen passes into the blood through the walls of the blood vessels in the lungs. Outdoor exercise and fresh air help to keep the lungs healthy.

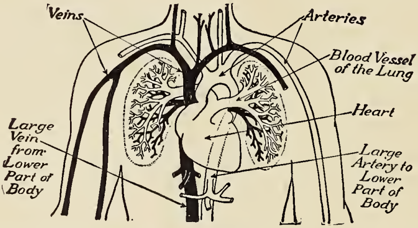
Each lung is made up, for the most part, of a great number of small air chambers. All of these chambers are connected with the windpipe. We have just seen that the windpipe is divided into two bronchi. These two bronchi subdivide again and again into many fine branches that go to all parts of the lungs.

In the walls of the tiny air chambers, there is a network of fine blood vessels. The blood flowing through these blood vessels is separated from the air in the lung by a very thin layer of living matter. Through this thin layer, the oxygen in the air may pass into the blood, and waste substances in the blood may pass out to the air.

The amount of fresh air which we supply to our bodies depends on the way we breathe. Rapid breathing and deep breathing increase the amount. A boy or girl who has been running or jumping will take many more breaths of air in a minute than when sitting quietly in a chair. Deep breathing is especially useful in giving the body plenty of air, because it carries a supply to the tiny air chambers in the very bottom of the lungs.

The breathing movements of the body can be felt if you will place your hands lightly on your body just above the hips. If you do this immediately after running, you will understand how active exercise gives excellent practice in deep breathing. When the muscles are exercised, without any planning on our part the muscles of breathing do more work, the breaths come more quickly, and the lungs are filled more completely. This supplies more oxygen, just as an open draft in the furnace supplies more air and makes the fire burn more brightly.

How the Blood Works for Us.—In the lungs, the oxygen enters the blood just as the digested food enters the blood in the walls of the intestine.

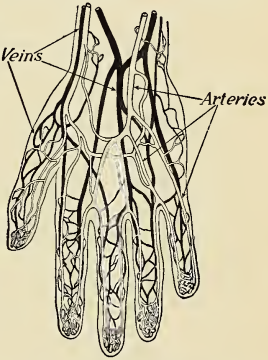

Veins
Arteries
Blood Vessel of the Lung
Heart
Large Vein from Lower Part of Body
Large Artery to Lower Part of Body

THE HEART AND SOME OF THE PRINCIPAL BLOOD VESSELS

The arteries, which carry the blood out from the heart, are shown in white; the veins, which bring the blood back again, are shown in black.

Both oxygen and food must now be carried by the blood to all the different parts of the body.

If you could trace one of the tiny blood vessels in the lungs, you would find that the stream it carries joins with another and flows into a larger vessel. That, in turn, joins with others and flows into a still larger vessel; and so on, until finally the combined stream from both the lungs pours into the heart. The heart is a hollow organ, about the size of the fist, which lies in the chest between the lungs, as shown on page 96. From the heart, the stream flows out again through a big blood vessel that measures nearly an inch across. This blood vessel branches into finer ones, which in turn branch into still finer vessels. In these the stream flows at last to the most distant parts of the body, to the top of the head and the soles of the feet, and to the tips of the fingers. After doing its work, the blood is collected again in small vessels which join to form larger ones. Finally, the large blood vessels bring it back to the heart once more.



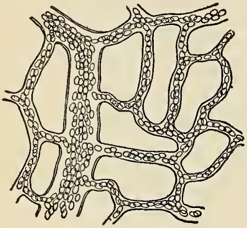
THE BLOOD VESSELS OF THE HAND

The arteries branch again and again to carry the blood with its oxygen to the farthest parts of the body. The veins collect and return the blood to the heart once more.

The blood vessels by which the blood flows out from the heart are called **arteries.** Those that carry the blood into the heart are called **veins.**

It takes a great deal of force to drive the blood through these fine channels to all parts of the body, and this force is furnished by the beat of the heart. The heart is a hollow chamber with very heavy muscular walls. It is all the time contracting and relaxing with a regular beat which you can hear by putting your ear to the left side of a person s chest. Each time the heart relaxes, blood flows in from the veins, and at each contraction it is forced out into the arteries.

The waves of pressure set up by the beating of the heart are carried all the way along the arteries. When the doctor puts his finger on the large artery in your wrist to feel the pulse, what he is really doing is counting these waves of pressure in the artery which are caused by the beats of the heart.



THE OXYGEN-CARRYING CELLS OF THE BLOOD

The tiny blood vessels in the foot of a frog as seen under the microscope. The little discs are the oxygen-carrying cells.

A city that is situated on the shore of a river or on the ocean is particularly fortunate, because ships can bring to it food and clothing, wood and coal, and the other things its people need. The blood serves the organs of the body as the river serves such a city, for, through every organ, the blood is constantly flowing as a stream of life, carrying the food and oxygen which the body needs.

We may wonder, perhaps, if there is anything in the blood stream corresponding to the ships which sail on a river and carry goods to the city on its banks. There is; and by using a special instrument called a microscope we can see these tiny ships. A microscope is a very powerful magnifying glass, through which we can see things so small that they are invisible with the eye alone. We cannot see the blood actually flowing through our own blood vessels even with a microscope. However, it is possible to see the blood flowing in the vessels of certain animals which have a very thin, transparent skin. The frog, for example, has a very delicate skin between its toes, and if the frog's foot is held under a microscope, you can see a wonderful sight. The thin part of the foot between the toes is full of small blood vessels, and under the microscope you can see in each of these vessels crowds of little round discs, like those which are drawn on page 98. They are not still and quiet, however, as you see them in the picture, but are rushing past at a great speed and tumbling about in the stream, as they are carried along by the flowing blood. These tiny ships are the **red cells** of the blood. It is the red cells which carry oxygen from the lungs to all the other parts of the body.

The Blood Has a Second Job.—Every organ produces wastes, just as a furnace forms ashes. A second job of the blood is to collect these wastes and carry them away. Some of these wastes are given off by the skin in the sweat or perspiration. Some of them are brought to the kidneys, where they are removed from the body in the form of urine. The bladder, in which the urine collects, should be emptied about six times a day.

One of the principal wastes which is formed by the action of oxygen on foods in the body is a substance known as **carbon dioxide.** This is a colorless and odorless gas which is a combination of oxygen from the air and carbon from our fuel foods. This carbon dioxide gas is given off by the burning of the fuel food in our bodies. Carbon dioxide formed in this way is carried by the blood back to the lungs, where it leaves the body as we breathe.

Carbon dioxide gas when bubbled through clear limewater forms a white milky substance. This is the limewater test for carbon dioxide. When you breathe through a tube into a glass of limewater, it will turn milky because of the carbon dioxide formed in your body and gotten rid of through your lungs.

Water is also given off from the lungs. You may see this by breathing on a cool mirror, or merely by breathing out into the frosty air in winter.

Keep Your Air Stations Clean.—A healthy nose and healthy lungs help to keep you comfortable and happy. Disease of the delicate skin which forms the inside of the nose is usually a cold. Bronchitis (brŏng-kī′tĭs) is a disease of the bronchial tubes which connect the windpipe with the lungs. Pneumonia (nů-mō′nĭ-ȧ) is a disease of the lungs themselves. In many schools, the records show that more boys and girls and more teachers are sick from colds and soreness of throat and lungs than from any other diseases.

Keeping noses, throats, and lungs clean helps to keep them healthy. The nose should be carefully cleaned each night and morning with a clean cloth or handkerchief. Air carries with it not only dust, but also a tiny form of plant-life called bacteria (băk-tē′rĭ-ȧ). It is certain kinds of bacteria which cause colds and other types of disease. The dust and bacteria which the air carries into the nose are caught on its moist lining and can then be removed with the discharge from the nose. Sometimes this discharge is black with smoke and dust. Bacteria which we cannot see are also present.

You should have a clean handkerchief when you leave the house every morning. It is important to know how to use it rightly. There is a tube which leads from the back of the throat into the ear. If you blow your nose hard with both nostrils, or passages, closed, dirt and bacteria may be forced from the throat into the ear, and earache may result. The proper way is to hold one nostril while you are blowing the other.

Always breathe through the nose and not through the mouth. The nose prepares the air for breathing (*a*) by warming it, (*b*) by moistening it, and (*c*) by cleaning it. The bits of dirt are taken out in passing through the nose, because, as we have just seen, they stick to its moist lining. Breathing cold, dry, dusty air directly into the throat through the mouth is a dangerous habit. If we cannot breathe comfortably through the nose, there is something wrong, and we should go to a doctor for examination. Cleanliness, proper air, exercise, sleep, and the friendly doctor all help to keep our air-receiving stations healthy.

Sometimes little bunches at the back of the nose, which doctors speak of as adenoids, become enlarged. Such growths make it hard to breathe through the nose. They make us snore and may interfere with the general development of the teeth and the shape of the mouth. Or the tonsils at the back of the throat may become sore. The doctor can remedy such conditions.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. What part of the air is necessary for the body? Why is it necessary?
2. Tell how the air enters the blood.
3. When does the body need more than the usual amount of air?
4. How does the body supply its blood with more air or less air as needed?
5. How does the blood help to remove the waste materials of the body?
6. Why is it important to keep the air passages clean?

Try One of These Suggestions:

1. Count for one minute the breaths taken by a boy or girl who has been sitting quietly at a desk for about half an

hour. Then ask the same child to run up and down a flight of stairs and return to his or her desk. Immediately count the breaths for one minute and compare the two counts. Explain why the body needed more air during the second part of the test. Record the results and explanation in your Health Diary.

2. Examine the lungs of a lamb or a chicken. Notice the tiny air chambers which make it possible for a great deal of air to reach the blood.

3. Moisten a handkerchief with perfume and shake it in a corner of the room. Ask the members of the class to stand as soon as they notice the perfume. Do they all stand at once? Explain.

4. Try the limewater experiment described on page 100.

5. Have a member of the class make a record of all absences for a month. The cause of absence should be marked. At the end of the month, find the total number of days' absence for each cause. What fraction or per cent of the total absences for the month was caused by colds or some other trouble in the breathing organs?

Discuss These Problems in Class:

1. Why do men going down into an old well, or some other deep place in the ground, first let down a light and watch to see whether it will burn?

2. Colds cause many absences in schools. What can be done to help prevent colds?

3. How may the removal of tonsils and adenoids improve the health of the nose and throat?

CHAPTER XI

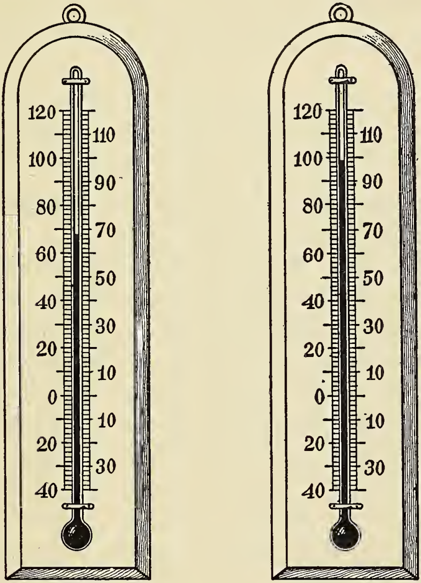
KEEPING THE SKIN HEALTHY

Body Temperature and the Skin.—The two thermometers in the picture show the temperature of a school classroom and the body temperature of the pupils in it. The body temperature of the children is 98.6°, and that of their room is 68°. If the room temperature were slowly increased to 98°, or even only to 90°, the lively boys and girls would all disappear. In their place we should have boys and girls who acted and felt as if they were half dead. They would begin to roll up their sleeves, drink cool water, and fan themselves. They would wonder what was the matter.

To understand why we feel full of life on a cold, brisk day and dull and listless on a hot, damp day, it is necessary to know something about the skin and the work it does for the body.

The skin is a very important organ. First of all, of course, the skin is like a delicate suit of armor, which fits the body very closely, protects it against germs, and keeps the soft, tender parts inside from being injured by sun or wind.

It is through the tiny sense organs and nerves of the skin that we learn a great deal about the things we handle, whether they are hard or soft, hot or cold, rough or smooth. The skin plays a part in getting rid of the wastes of the body, by means of glands which pour out some of these wastes in the form of perspiration.



THE TEMPERATURE OF THE ROOM AND THE TEMPERATURE OF THE BODY

The body is producing heat all the time, yet it always keeps its own temperature close to 98.6° F. In order to do this, it should have cool air about it to carry off the extra heat produced.

Above all, however, it is the skin which helps us to keep the temperature of the body always about the same. How do we keep our bodies cooled down to 98.6° during hot weather? How do we keep our bodies warmed up to 98.6° during cold weather?

Some animals cannot do this at all. Fishes and frogs and insects have nearly the same temperature as the air about them. With birds and dogs and people it is different. How do birds and dogs keep their temperatures the same?

When you have been outdoors in winter, your hands and cheeks often feel cold. However, if a thermometer such as the doctor uses were placed in your mouth, it would register between 98° and 99° in January, just as it would in August. This is a very remarkable thing—that the body should keep its temperature just the same, whether the air around it is below zero or nearly 100°. We can make machines, like the incubators used in raising chickens, which will do this; but they do not work nearly so perfectly as the human body does.

Our bodies are using fuel food and they are producing heat all the time, day and night and summer and winter. Of this body heat, only enough is needed to keep the body temperature at about 98°. In very cold weather, we eat more fuel foods and we dress warmly to keep in our heat, as Chapter XII tells us. Winter and summer, however, the body gives off about the same amount of heat as a burning candle.

Body heat equal to the heat from one burning candle doesn't seem much; but getting rid of it just fast enough and not too fast is very important to the body's comfort.

Controlling Body Temperature.—In order that the temperature of the body shall remain about the same all the time, the amount of heat given off from the body through the skin must just equal that which is formed inside the body. In cold weather we might expect that the body would lose heat very rapidly, and that the blood flowing through the skin would become chilled. The blood vessels of the skin, however, take care that this shall not happen. They contract and become so small that very little blood can pass through them; and thus warm blood is kept in the inner parts of the body.

When we are in a very warm room, on the other hand, our bodies have hard work to get rid of their heat. Then all the blood vessels of the skin expand, so that as much blood as possible is allowed to flow through and be cooled by the outside air. The cheeks become flushed in a hot room, just as the whole body becomes pink in a hot bath. On a hot day, our hands feel swollen and moist. These changes and many others result from an enlargement of the blood vessels of the skin, as they try to regulate body temperature.

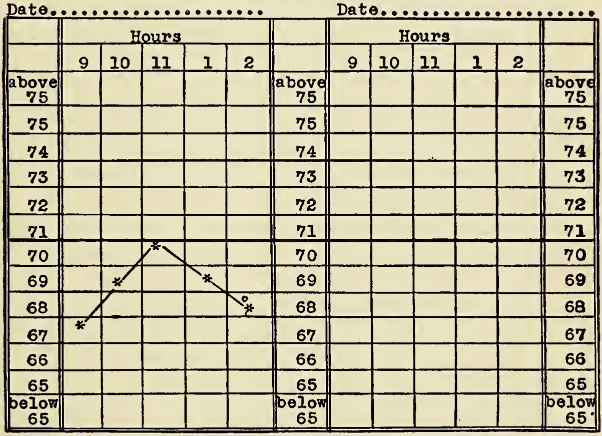
There is another change that takes place when the air is warm, which helps a great deal in regulating the temperature of the body. All through the skin are tiny organs called **sweat glands.** They pour out sweat, or perspiration, as soon as there is danger that the body may become overheated. The moisture from these glands evaporates and cools the skin. We can see that the evaporation of moisture cools the skin if we wet a finger and hold it up in a breeze.

The skin has then, for its work of controlling the body's heat, tiny blood vessels and perspiration or sweat glands, with the nerves to control them. When a room becomes too warm, the nerves of the skin signal to the brain, "It is hard to keep cool." The brain replies, "Open up all the blood vessels in the skin, so that extra blood can be rushed through for cooling."

When the skin nerves report to the brain, "Eighty degrees and no breeze," the brain sends back the order, "Open the blood vessels and open the pores." **Pore** is the name commonly given to the openings of the sweat glands. At still higher temperatures, the brain will order, "Open the blood vessels and the pores as wide as possible." If the body is still uncomfortably warm, the brain will send messages to the hands with such orders as, "Fan the air. Change heavy clothing for light, thin clothing. Get a cool drink."

If the skin's nerves should report, "Forty degrees and a stiff breeze," the brain would order, "Close down on all the blood vessels and perspiration pores in the skin." At the same time, the hands would probably be ordered, "Get a warm coat or sweater, a cap, and some gloves."

DAILY TEMPERATURE RECORD



Date.................... Date....................

	Hours						Hours					
	9	10	11	1	2		9	10	11	1	2	
above 75						above 75						above 75
75						75						75
74						74						74
73						73						73
72						72						72
71						71						71
70			*			70						70
69		*		*		69						69
68					*	68						68
67	*					67						67
66						66						66
65						65						65
below 65						below 65						below 65

A SCHOOLROOM TEMPERATURE CHART

It is an excellent plan to keep a record of schoolroom temperatures and to cool the room whenever it gets above 68°.

Alcoholic drink may interfere with this work of the skin because it dulls the brain and nerves. It has caused deaths from freezing and from heat.

In sickness the machinery which controls the temperature of the body is often affected. If our body temperature goes very much above 99°, we say that we have a fever. If you feel half sick or out-of-sorts, it is a good thing to have your temperature taken. Put a doctor's thermometer into your mouth to see whether you have fever. Often a rise in temperature is the first sign that an attack of some disease is beginning.

Helping the Skin to Do Its Work.—How can we help the skin do its work of keeping the body temperature the same? We can do this by eating a large amount of fuel food in cold weather and a small amount in hot weather, by dressing according to the season, and by keeping the temperature of home and schoolroom at the point which is comfortable for the skin.

A great many people injure their health by keeping the rooms in which they live too warm. Still, hot air in a living room or schoolroom or office makes people dull and sleepy. They do not feel like working or playing. Their blood vessels get weak and flabby, so that when they go where it is cold, as they sometimes must, they feel the chill and very easily catch colds or other diseases.

The air of a close room smells stuffy. This is not only very unpleasant but it may also do real harm, for such air is usually overheated. When we cool off the air in an overheated room, we are really trying to help the skin do its job. A well-trained skin does not need nearly so much help as a poorly trained one. A well-trained skin does not want an extra sweater or coat indoors, and it never complains that a room temperature of 68° is too cool. A cold morning shower or sponge bath is always welcome to a trained skin.

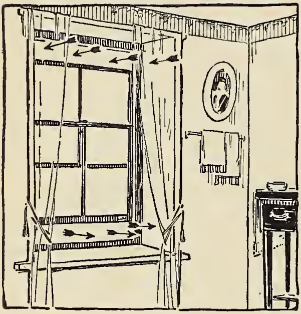
Cool, slightly moving air helps to keep the skin comfortable and well trained. Doctors have found that indoors, in winter, a temperature of about 68° is best. At this temperature, people feel better and have fewer colds. Air which is slightly moving helps to carry heat away from the skin and so makes the sweat evaporate faster. This also helps us to cool off. A breeze on a hot day does much to keep us comfortable. A breeze on a cool day may be harmful because it cools the body too rapidly. A draft that cools one part of the body more than another is also dangerous.

Fresh air—that is, cool, moving air, without too much draft—is necessary for the health of the skin and its blood vessels, and for the comfort and health of the whole body.

It was a great help to the skin when men learned to build houses and gave up their caves and huts. Houses protected them better from the severe chill of winter. Unfortunately, we can have too much, even of a good thing. Many of us in America suffer from houses and schools and offices that are kept too warm. Our health sometimes is seriously injured, both by the heat itself and by the sudden shock we feel when we go into the chill outer air.

Ventilation for Health.—We know that the body of every boy and girl is giving off all the time about as much heat as a burning candle. No wonder our schoolrooms sometimes get too hot. To prevent this, we must supply the room with plenty of cool, fresh air. This is called **ventilation.**

In a living room where there are not many people, enough air may get in—if it is cold outside—through cracks in the window frames and floors and other places. Where a great many people are crowded together, as in a schoolroom, it is generally necessary to provide some special way for the air to enter.



GOOD WINDOW VENTILATION

The window should be open top and bottom, so that cool fresh air can come in below and warm stale air go out above.

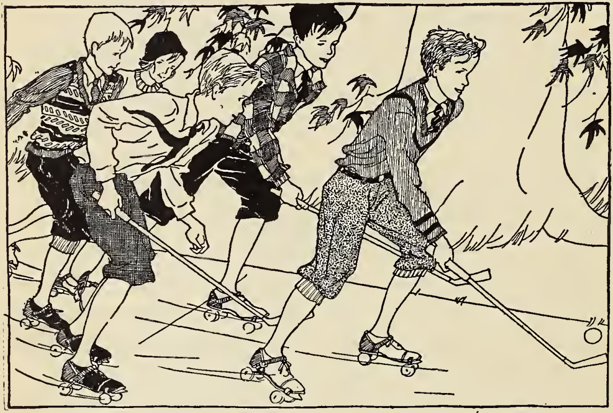
In letting air through the windows, we must be careful not to have a direct draft of very cold air on the people who are sitting near the windows. Cool air is good, and moving air is good, but we must not overdo it. There are several things that can be done to prevent dangerous drafts of this kind. If the steam radiators in a schoolroom, for example, are placed along the wall under the windows, they will warm the incoming air. If sloping glass plates, called window-boards, are placed inside the windows at the bottom, they will shoot the cool air up and mix it with the rest of the air in the room, so that it will not strike anyone directly.

In ventilating with windows, always remember that the air should have a place to come in and a place to go out. Warm air rises because it is lighter than cold air. If a window is open a little at the top and a little at the bottom, or if one window is open at the top and another at the bottom, the cool fresh air will come in by the lower opening, and the warm stale air will pass out by the upper one.

In many schoolrooms and factories, and in most lecture halls and theaters, where a great many people are crowded together, it is necessary to provide more fresh air than we can get by opening windows. In such cases, the outside air is drawn in at the basement by great revolving fans, is warmed a little, and is then forced up to the rooms through big pipes built into the building.

A room temperature of not more than 68° is so important that many well-regulated schools make daily temperature records. During cold weather, the temperature is recorded and, if necessary, corrected about five times each day. Such a record appears on page 109. In the schools of certain cities, a large thermometer with a big red mark opposite 68° is set up on the front of the teacher's desk in each classroom so that the teacher can see when the room is getting too hot. This is a good thing, but it would be still better if someone could invent a thermometer that would ring a bell at 68°.

No kind of ventilation can make the air in our houses and schools quite as good as the air of the great outdoors, where the sun shines and the wind blows. There is plenty of time for reading and sewing and other indoor work and play in wet weather and in the late afternoon. Swimming, roller skating, bicycling, baseball, and other games in summer, or skating, coasting, and playing in the snow in winter, are better than books while the sun is shining.



FRESH AIR

The best air is outdoors in the wind and sun. How many hours did you play outdoors yesterday?

In the sleeping room, the windows should always be open, wide open in summer, and open a few inches even in the coldest weather. We really cannot get complete rest during our sleeping time unless there is cool air moving about us. Many people find it pleasant and healthful to sleep out of doors on a sleeping porch or balcony, and where this is possible it is a very good plan.

Train Your Skin.—Special training for your skin should include outdoor exercise at all times, especially in cold weather, outdoor air in your sleeping room, and always a cold rinse after washing your hands, face, or body.

There are other valuable ways of stimulating your skin; that is, of making it more active. Skin stimulation is really exercise for the blood vessels of the skin, and it trains them to do their work well. Here are some things you can do to help. Your skin may be rubbed each morning with a rough towel, or first with a cold wet cloth and then the dry rough towel. A cold bath or shower is an even better form of skin stimulation, if the habit is begun gradually. A warm, comfortable feeling will usually follow a cold bath, if you are strong and well. The boy or girl who takes a cold bath every morning is much less likely to have colds than the one who has not stimulated his blood vessels in this way.

Washing the skin is necessary for many reasons. Not only does it stimulate each of the tiny skin blood vessels, but it also removes the sweat, or perspiration, given off from each little sweat gland. You have discovered that sweat glands help to control your body temperature; therefore you must keep them clean and open for business. Clean skin is necessary for every one of you. It means health, comfort, and attractiveness to yourself and your friends.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. How does the skin manage to keep the body cooled down to 98.6° on a warm day?
2. How does the skin manage to keep the body warmed up to 98.6° on a cold day?
3. State at least three ways of keeping the skin in good training.
4. What do you understand by "skin stimulation"?

Try One of These Suggestions:

1. Look in your dictionary for the words *temperature, thermometer,* and *ventilate,* to see whether you really understand them.
2. Keep a daily temperature record for your classroom. Read the temperature at least four times each day. If possible, each member of the class should mark the record for two days or more during the winter.
3. Make a cardboard model of a four-room house, with windows so placed that it can be well ventilated.
4. To study the movement of air, open a window two or three inches at top and bottom. Hold a saucer with burning incense before an opening and see whether you can tell

which way the current of air is moving. If the school has fan ventilation, hold the burning incense at the openings of the ventilators. Make a diagram of the room and use arrows to show where air enters and leaves the room.

5. To study the temperature at different levels in the schoolroom—on the floor, near the ceiling, and half way between—place three thermometers at the different heights. After these thermometers have remained there for some time, read them and explain your results.

6. Find out how your school building is ventilated. If there is a special system of ventilation, find where the air comes into the building and where it goes out. If you receive fresh air from a fan system, ask the principal if you may visit the fan room.

7. Draw a diagram to show how you ventilate your bedroom. Paste the diagram into your Health Diary.

Discuss These Problems in Class:

1. How does the current of air from a fan help to keep the body cool? Is the temperature of a thermometer any lower when air blows on it? (Try fanning a dry thermometer; then dip it into water which is the same temperature as the room and fan it again. Do you notice any difference?)

2. Why were the Indians comfortable with less clothing than we wear?

3. Of what materials do people build their houses in different countries? Think of the houses of the Eskimos, the Mexicans, some of the African tribes, the Irish peasants, and others.

CHAPTER XII

COMFORTABLE, ATTRACTIVE CLOTHES

Why Do We Wear Clothes?—If a group of boys and girls should come together from China and Sudan, from Italy and Eskimoland, to stage a fashion show, we could learn many facts about clothes. Why do they wear clothes, and why are the clothes of some of them made of fur and the clothes of others of silk? Why are some clothes thin and light-colored, and others heavy and dark? Much of the difference in clothing is simply a matter of fashion. In Europe and America, men generally wear trousers and women skirts, while in China, it is just the other way. For many clothes customs, however, there are good, sound reasons concerned with the health of the body.

We have already discovered how clothes help to keep our bodies comfortably warm in winter. Our Eskimo friends would tell us that, in their country, even a well-trained skin could not keep the body temperature up to 98° without the help of fur and leather clothing. The children from India and Brazil would tell quite a different story. Their countries are so warm that the skin's main job is to keep the body temperature down to 98°. They wear very little clothing, and what they do wear is light in weight and light in color. We know that light-weight clothing helps the body heat to escape, and also that light-colored clothing looks cool. Light-colored clothing does not take in the heat from the sun as dark clothing does, but reflects it away. This is why we ourselves often wear white in summer.

Our friends from Arabia and their neighbors from Sudan have a clothes problem somewhat different from that of the East Indians. Their climate is hot, but it is also very sunny. They not only have to keep their bodies cooled down to 98°, but they must be protected from the glare of the hot sun and the burning sand. The Arabs, therefore, choose heavy, light-colored clothing, and, in spite of the heat, they wrap themselves in it from head to foot. To help the body heat to escape, this heavy clothing is loose and has large, flowing sleeves. Without this protection Arabian boys and girls would be seriously sunburned and blistered. Even in our country, we know something of how disagreeable sunburn can be, and sunburn here is nothing compared with sunburn on the desert.

Boys and girls from England who are out of doors in rainy weather wear hats, coats, and shoes made of rubber. During the rainy season in tropical countries, the people use only an umbrella for protection, or they stay at home when it rains. Body heat passes through rubber very slowly, so that wearing a raincoat in a hot country would be very uncomfortable.

SENSIBLE CLOTHING IN JAPAN

Children in other countries wear clothing to fit the climate. We should do the same. (*Publishers Photo Service*)

All our foreign friends seem to wear clothing which is suited to their needs. Suitable clothing, if it is clean and neat, usually looks well too. The uniforms of boy and girl scouts are good examples of suitable clothing. No costume for camping and hiking could be more comfortable and attractive. You would set a fine standard for yourself and your friends if all your clothes were as comfortable and as suitable to their use as are a scout's clothes.

Clothes Should Fit the Occasion.—Suitable summer clothing should be light in weight and light in color to help keep us cool. Simple clothes made from washable materials like cotton, linen, and silk are comfortable and also easy to keep neat and clean. Cotton is specially good for summer wear. It is made from the fine hairs or fibers on the seed of the cotton plant, one of the great crops of our Southern states. It is cheap and strong and allows heat to escape easily. The only fault of cotton is that it also lets moisture evaporate quickly, so that if we exercise and perspire freely during cool weather, the body may chill too rapidly in cotton clothing. Linen is like cotton in many ways. It, too, is made from a plant, the flax plant.

Winter clothing must be warmer, and therefore it is usually heavier than summer clothing. When we go out into the winter air, we may dress warmly in clothing made of wool which is cut from the backs of sheep, or perhaps we may wear a leather jacket made from the skin of some animal, or a coat made of skin and fur. Woolen cloth, knitted cloth, fur, and double layers of clothing—such as coats with linings—are warm because they are loosely woven or porous and so contain a great deal of air. Cotton and linen are woven closely and therefore contain much less air. Air in the clothing forms a sort of blanket which helps to keep us warm. Woolen clothes are particularly good when we exercise and get overheated in cold weather, because wool absorbs moisture and protects us against the chill of too rapid evaporation.

It is dangerous to get overheated by sitting indoors or by playing hard outdoors and then to sit down in a cold place with no extra wraps. It is quite as bad for the clothing to be too heavy as not heavy enough. Many people make themselves weak and sickly and unable to resist even moderate cold by wearing too heavy clothing. Heavy underclothes are not healthy, even in winter, if our houses are well warmed. Our heated homes and schoolrooms have been called the Indoor Tropics. Since we spend a great deal of time in these Indoor Tropics, much of our clothing, even during the winter, can be made from the thinner, washable materials. We must provide, however, for wearing warmer clothing when we go out of doors. Sweaters, wool or leather coats, overshoes, and gloves all help to solve this problem.

Wet-weather clothing is a problem by itself. The body loses heat very rapidly when it is damp. It is, therefore, dangerous to have the shoes or the clothing wet. Shoes, hats, and coats of rubber help to keep the body dry and thus prevent chilling. At the same time, however, rubber clothing interferes with the regular loss of body heat. To keep a skin well trained, rubbers and raincoats should be worn only when necessary, and should always be removed when indoors.

SENSIBLE CLOTHING IN ALASKA

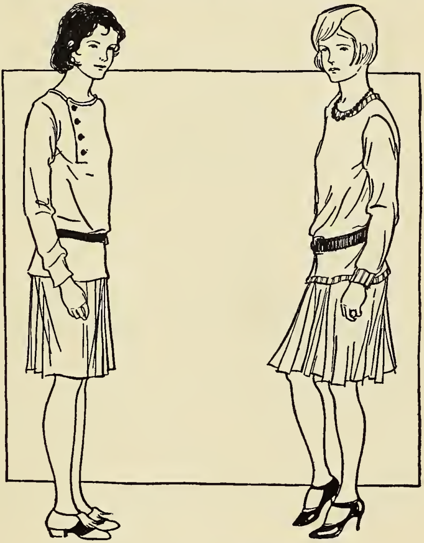
Children in cold countries wear warm, heavy clothing. We should follow their example in cold weather. (*Ewing Galloway*)

Whatever our clothes are made of, they should not be so tight as to interfere with circulation or with the normal movements of the body. Tight garters, for instance, are undesirable.

Night clothing is important because comfortable night garments add much to the restfulness of our sleep. Comfortable night clothes are loose and clean. They also help to keep us warm or cool as the need may be.

There is one question you should ask yourself about all of your clothes—are they clean? In the summer time, when you wear light-weight dresses or suits, the problem of clean clothes is not such a big one. A good tubful of hot water and soapsuds will quickly make dirty clothes clean. In the winter time, the problem of clean clothes is more difficult. You wear woolen dresses or suits longer than you wear cotton clothing. Of course, woolen dresses and coats can be sent to a cleaner, who will freshen them up and press them into shape once more; but often simple washing is better—and many woolen garments can be washed if care is used. It makes no difference how many or how few your clothes may be, they can always be clean. Outside clothes, underwear, stockings, night clothes, all must be changed often if you are to be comfortable and if you wish to look and feel your best.

Good Shoes and How to Choose Them.—Clothing for the feet is last but not least. As scouts pass in a line of march, they demonstrate suitable clothes for working feet. Working feet need plenty of room to stretch out straight so that none of the bones are cramped and bent. Stockings long enough but not too long, and shoes long enough but not too long, are necessary to keep working feet straight. People whose feet must work overtime to keep them standing suffer much discomfort if stockings or shoes are too short. Bones are sometimes crowded out of place. The muscles which hold the arch of the foot are weak-



GOOD SHOES

Which of these two girls is likely to have feet which will carry her gracefully and well in a game or on a walk?

ened. Callouses and corns form on the skin to protect it from the pressure of the short shoe or stocking. The nerves in some feet do not report these difficulties promptly, but finally there comes a day when they are very uncomfortable. It is hard to believe that shoes or stockings are to blame for these troubles, yet such is the case.

There are shoes which will prevent these difficulties, or even correct them if necessary. Such shoes have a straight inner line from heel to big toe, plenty of room for all the toes to move straight ahead, and a broad, fairly flat heel. Without the support of a broad heel, it is almost impossible to stand or walk well. If a person sits most of the time, shoes which crowd the toes and have high heels may do little or no harm. For working feet, however, it is only fair to provide broad-toed, low-heeled oxfords. Feet which are made to work while they are crowded into narrow, high-heeled shoes are apt to be mean about it. "If we aren't taken out of this horrid jam," they will complain, "we'll cause an accident or make you cross and ugly, so that there will be trouble." Feet in good sport oxfords are usually comfortable and happy. They are likely to say, "We always feel fit till the last hour of the hardest day, and we'll keep you feeling fit."

Each day soldiers have a morning inspection. They stand in line and at attention while their officers look them over and make sure that they and their uniforms are clean and orderly. It is a good plan for each of you to act as your own colonel every morning and make an inspection before coming to school. "Are my clothes well chosen to suit the weather? Are they free from dust and stains? Are they smooth and unwrinkled? Are the buttons all on? Are my shoes clean and shining?" These are the questions to ask yourself. If you can answer "Yes" to every one, you can pass the morning inspection and face the world like a good soldier.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. Why do the Arabs wear heavy clothes in a hot country?
2. Which materials are good for summer clothing and which for winter clothing?
3. Why should wet clothes be changed as soon as possible?
4. What are three things to look for in buying shoes?

Try One of These Suggestions:

1. Place a thin piece of cotton or silk cloth, a thick piece of woolen cloth, and a piece of leather on a warm radiator. Then place the hands lightly on each in turn and notice whether different amounts of heat seem to come through them. What does this experiment show as to the clothing value of each of these materials?
2. Arrange a fashion show in which the characters take the part of an Egyptian girl, a Swiss boy, an English boy, a Russian girl, a Japanese girl, a Cuban boy, and any others

which the class may select. Each character tells about his clothing and explains the reasons for its material and style.

3. Use the following score card to keep a record of your shoes:

My Shoes	Perfect Score	My Score (1) (2) (3)
1. Straight inner line from heel to big toe....	20	....
2. Broad toe and low, broad heel...........	20	....
3. Length to allow straight toes.............	20	....
4. Laces or buttons, neat and in working order.	20	....
5. Shoes neat and clean.....................	20	....
Total Score.........................	100	

Discuss These Problems in Class:

1. How does a thermos bottle keep liquids hot or cold? If possible, examine one in class. Decide how the principle of the thermos bottle applies to clothing.

2. Work out a score card that each one of you might use in your morning inspection of your clothes.

3. If possible, collect samples of cloth which will make suitable clothes (suits, work blouses, dresses, and underclothing, for instance) and discuss their advantages and disadvantages.

CHAPTER XIII

GOOD POSTURE

Heads Up!—Dr. Keepwell, the new school physician, stopped one day to visit the neighborhood playground and asked, "Why don't you girls have a scout organization the same as the boys?"

The girls were surprised, and Jane asked, "How do you know we aren't scouts?"

Dr. Keepwell smiled at Jane and replied, "Some muscles and bones that I've met here on the playground told me that most of the boys were scouts but that the girls were not."

The boys were pleased with the doctor's approval, but they also were puzzled, and David said, "Aw, Doctor, how could bones talk even if there were any out here on our playground?"

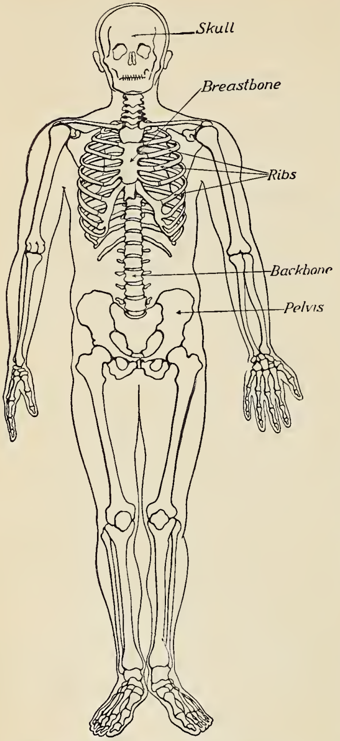
"There are a great many muscles and bones on this playground, and they can talk and talk very well indeed," laughed Dr. Keepwell.

Then suddenly Jane exclaimed, "Oh, Doctor, do you mean the muscles and bones in our bodies, and can you look at us and know which ones are scouts?"

"That is exactly the idea, Jane. The bones and muscles of scouts tell about their good work because they show it wherever I see scouts at rest or work or play. Bones and muscles must be trained to work well, and good scouts usually do this training. Scout leaders speak of it as training in good posture."

"Well, hurrah for our scout leader!" interrupted one of the boys. "He'll be pleased to hear what you've just said, Doctor. He's been giving us special posture drills for a long time."

"I was sure of it," responded Dr. Keepwell, "and I am delighted to hear it. Good posture helps not only your appearance but your health and comfort too."



THE FRAMEWORK OF THE BODY

Each one of us has a bony framework like this in his body. See which of the bones shown in the picture you can feel in your own body.

The girls wanted to know about a posture drill and how they could help their muscles and bones to say, "We've been well trained." The boys explained that drill was only practice, and then and there the girls learned the first simple directions for good standing posture—toes pointing straight in front, weight equally on both feet, and head up. In this position, they stood on their tiptoes and pushed their heads toward the sky. Jane was surprised to feel the muscles in the trunk of her body get to work, and soon the others made the same discovery.

The Framework of the Body.—During the following weeks, the girls found out a number of things about good posture. They found out first of all how the body is built over its bony framework of skeleton.

Jellyfish swimming in the water look just like clear glassy bells. When they are washed up onto the sand, they seem like mere lumps of lifeless jelly. They have no bones or hard parts at all, and outside of the water they are quite helpless.

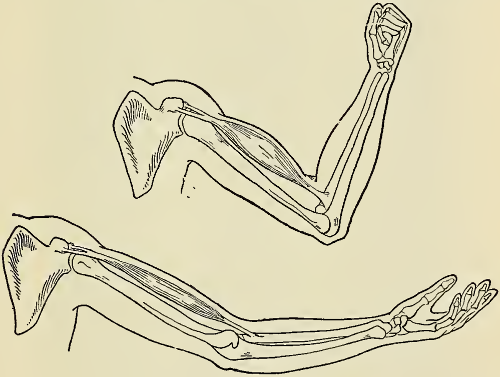
Most animals that live and move about in the air, and many of those that live in the water, have some sort of skeleton made up of hard parts which give their bodies firmness. All the animals which can move quickly and powerfully must have skeletons.

Sometimes the skeleton of an animal is on the outside, as in the case of a beetle or an ant. Sometimes it is inside, as in the case of the bones in our own bodies.

There are about two hundred bones in the whole body. Some of them—in the skull for instance—are fixed firmly to each other, but at many places the bones are fastened together in such a way that they can be moved in certain directions. Such a connection is called a **joint.** We have seen men in the circus who could put their feet up behind their heads and almost tie themselves into bowknots. They show how the power of bending the joints can be developed by exercise. In very old people, on the other hand, the joints sometimes become so stiff that they can hardly be moved at all.

The Muscles and How They Move.—Dr. Keepwell explained how, by means of the bones and the muscles, we are able to make the many movements of the body. The muscles have the power of contracting, or shortening, like a rubber band. Each muscle is joined at its two ends to bones or other firm parts of the body, and when the muscle shortens, it brings nearer together the two parts to which it is fastened.

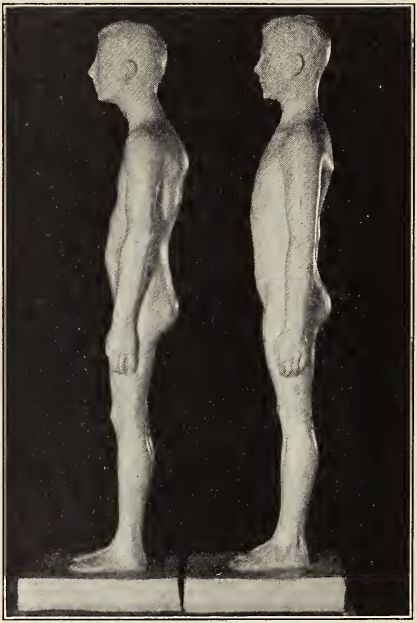
The way in which the muscle bends the arm at the elbow is shown in the picture. This big muscle, which is called the **biceps** muscle, runs from the shoulder down the length of the upper arm and is fastened to the upper part of the forearm, just below the elbow. The muscle is shaped like a spindle and, when the arm is straight, it is stretched out and loose. When you bend your arm, it becomes short and thick. Since the ends of the muscle are fixed to the shoulder and the forearm, this shortening pulls the bone in the forearm toward the shoulder. Press your left hand tightly on the upper part of your right arm. Bend your right arm slowly up. If you have well-developed muscles, you can feel the biceps muscle thicken and swell.



HOW YOU MOVE YOUR ARM

The biceps is the large muscle which you can feel swelling up if you place your left hand over your right upper arm and then bend your right arm at the elbow. The biceps muscle is attached at one end to the shoulder and at the other to the forearm, so that when it shortens and thickens, it pulls the forearm up as shown in the upper figure.

There are hundreds of different muscles in the body, and all together they make up about half its weight. The lean part of meat which we eat at table is the muscle of the cow, pig, or sheep. The muscles, like the bones, differ among themselves in shape and size according to the special work they have to do. The legs and the arms are almost solid masses of muscle, except for the



PETER SLUMP AND PETER POSTURE

Which Peter are you like? (*Courtesy of Grace Davis, University of Cincinnati*) bones inside, while the trunk is enclosed back and front in great sheets of muscle.

The muscles in the legs, by which we make the movements of running and walking, are large and powerful, but the biggest muscles of all are the ones in the back which men use when they lift heavy weights. One of these back muscles weighs several pounds.

On the other hand, every flickering of an eyelid and every change in the expression of the face is brought about by the contraction of tiny muscles in the skin.

Are You Like a Jellyfish?—Dr. Keepwell explained that we all start with much the same kind of framework in our bodies. You would hardly think so to look at the people in the street, or perhaps even in your own school. Some are erect and strong and well balanced on their feet, so that it is a delight to look at them, while others are stoopshouldered and slouching, with bent back and head thrust forward. Yet the bones are the same in each case. It is simply that one person has trained his muscles to hold the bones in place, while the other has let the muscles grow slack and loose and has become as much like the jellyfish as he possibly could.

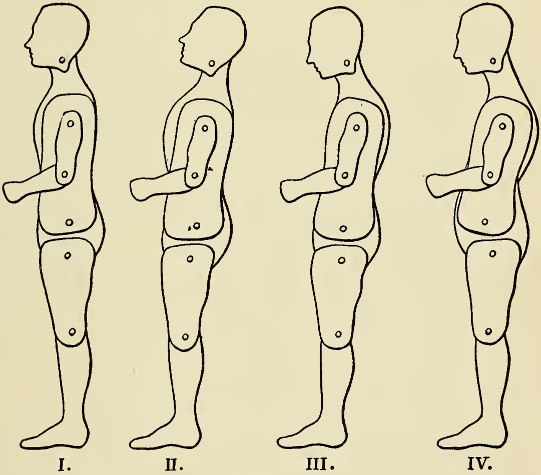
The person with poor posture is not merely unattractive to look at; he is likely to be unhealthy, too. If your body is slouched and your head dropped forward, the organs in the chest will be cramped, and the muscles of the lower trunk, the abdominal muscles, will become flabby and unable to keep the intestines in their proper place.

If your body is held correctly, it should not lop to one side or to front or to back. The shoulders should be flattened, the head up, the knees straight, the feet set squarely side by side and pointing straight forward. When practicing a good position, try to "stand tall." In sitting, your body should be bent only at knees and waist, your head, neck, and trunk being in one straight line.

"The most important point of all in good posture, whether standing or sitting," Dr. Keepwell told his class, "is to pull in the muscles in front of your stomach. If you do this, the rest of your posture will almost take care of itself."

One day Dr. Keepwell sent the girls a jointed posture doll. They called him Robin Hood. When he was held by his head, Robin's posture was perfect. When his head was tipped backward, his chest was too high, and the girls decided that exactly the same thing must have happened to them when they pulled their back muscles too hard. When Robin's head was tipped forward, his shoulders humped and showed what happened if the back and neck muscles are not working at all. The worst posture, if one poor position can look worse than another, was illustrated when they pushed out Robin's stomach to show the result of flabby abdominal muscles.

Practice Makes Posture.—Feet as the foundation of good posture were of special interest to the girls. Some of them had seen their own feet in an X-ray picture. They remembered seeing the five long straight lines of bones, each of which ended in a toe.

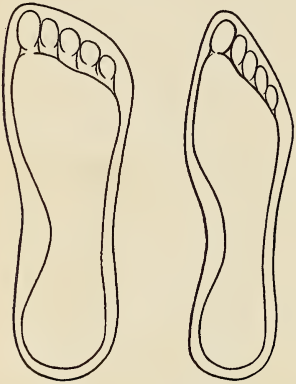


ROBIN HOOD, THE POSTURE DOLL

Which position is the right one? Can you tell just what is wrong with each of the other positions? (*Courtesy of N. W. Fradd, Harvard University*)

A print of the foot shows that it is arched to give it strength for its work. This is because an arched foot, like an arched bridge, is stronger than a straight one. When the muscles of the foot are poorly used or trained, they may allow the arch to fall or the ankles to wobble. Feet which are not doing their job, because of fallen arches, are not good-looking.

Indians train their feet especially well and care for them too. When an Indian goes walking, his toes always lead straight ahead. This gives him greater endurance as well as fine form. The Indian moccasin allows plenty of room to keep the long rows of bones straight to the ends of his toes. When the Indian is barefooted, his toes have all out of doors to enjoy.



HOW DO YOU TREAT YOUR TOES?

This shows how the foot looks in a good and a bad shoe. A good shoe has a straight inner line from heel to big toe and has plenty of room for all the five toes.

Soon many of the girls were standing even better than some of the boys, because daily practice in taking good posture helped them to know the feel of it, and to want that feel all the time.

For good sitting posture, they had to learn to push their hips against the back of a chair or seat and to bend only from the hips. Some back, chest, and abdominal muscles resented the fact that they had to work while the girls were sitting. After a time, however, the muscles were perfectly comfortable when they held the back straight, the chest up, and the abdomen flat. Slumping no longer appealed to these muscles, and they could say to every passer-by, "We're trained to do good work."

Sometimes poor posture is the result of a seat or desk at school which causes strain. If the desks and seats at school are not so arranged that you can sit comfortably at work with your back straight, you should ask the teacher if your seat cannot be changed, or the chair raised or lowered. If a chair is too high or too near your desk, so that you have to bend your shoulders over or twist your body sideways to get at your work, it may do real harm.

The Prince and the Robber Children.—Finally Dr. Keepwell told the children a story which helped some of them to remember the importance of good posture. It was a story of a young prince who was once traveling with some of his courtiers to a distant city. The party was set upon in the forest by robbers, who killed all the attendants and carried off the prince as a prisoner. They took away his fine clothing, dressed him in rags, and made him live like one of their own dirty and untidy children. But he never forgot that he was really a prince.

The governor of the city heard about the kidnaping, and he sent out soldiers who drove away the robbers and brought all the children in their camp to the governor's palace. The young prince told the soldiers who he was and thanked them for rescuing him. The robbers' children, however, were as bad as their parents. As soon as the real prince had spoken, one of them cried out, "That is not true. He is not the prince. I am the prince." And another said, "No, I am the prince," and another, and another. All the children were dirty and clothed in rags. No one in this city had seen the prince since he was a baby, and the soldiers were much puzzled.

The governor of the city, however, was an old man and very wise. He had all the would-be princes brought before him. After looking at them for a moment, he went up to the real prince and said, "Your Highness, I know that you are the prince because you hold yourself like a king; and I know that these others are the children of the robbers because they slouch and crouch like thieves, as they are."

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. How could bones and muscles talk to Dr. Keepwell?
2. Give two suggestions for developing good posture.
3. What are three points to watch for in good sitting posture?
4. How do the muscles move the bones?

Try One of These Suggestions:

1. Organize a posture drill and practice good standing and sitting positions.
2. Learn to take good walking posture with a book balanced on top of your head. Then march around the room without touching the book or losing it.
3. Some day as you walk on the street, notice the feet of five or ten people. Do any of them point their toes out instead of straight ahead? Do you notice any ankles that are wobbly?
4. Turn to Chapter XII and read about comfortable, attractive shoes.
5. Examine the skeleton of some animal and decide whether any parts are like those of the human skeleton shown on page 130. The bones of a chicken might be used, or a picture in a large dictionary or encyclopaedia.
6. Examine the drumstick of a chicken and notice how the muscles are attached to the bone.

Discuss These Problems in Class:

1. How can the right kinds of food and plenty of sleep affect posture?
2. How can exercise affect posture?
3. Have a debate on the subject, "Resolved, that good posture is a sign of good health."

CHAPTER XIV

EXERCISE FOR HEALTH AND HEALTH FOR EXERCISE

Train Your Body by Exercise.—A successful field day is a great occasion. The races, the broad jump, the pole vault, and the hurdles are all thrilling events. The crowd cheers, and the friends of the winners are proud and happy. It is a big day for everybody. But the athletes who take part in the events know that their chances for success began many weeks and months and even years before. A long, long time is necessary to build and to train a fine body machine.

All the parts of a body machine help to win a race. Fine lungs, an excellent heart, a good stomach, and a clear brain—each does its absolutely necessary part. It is the muscles, however, which make all the actual racing motions. To make winning motions, these muscles must be well trained, and even to make the ordinary motions of walking and swimming and skating, muscles must be given practice before they can do their best.

Exercise, the word we all like to use, means practice. When we go for a hike or play a game, we are giving our muscles practice in doing these things. Shoveling snow or hoeing a garden also gives our muscles practice. These exercises, whether we do them for work or play, are work for our body machines. The muscles of the legs and trunk are the parts of the machine which move it from place to place. These same muscles must work to lift the body up a flight of stairs or up a hill.

If you are in poor training, you will show the effect of this work when you puff and blow after climbing a flight of stairs. If you are in good training, you will walk up with perfect ease and comfort.

It is possible to train the body to do extra work readily and well. The story is told of some young men at a country fair who carried heavy weights across a river. One of them claimed that he could carry a year-old calf. The animal was almost full grown; it did not seem possible that he could carry it, and his friends begged him not to try. However, he brought his calf and carried it easily through the deep water. He explained that he had begun to train himself when the calf was born, and that he had carried it each day, getting stronger all the time as the calf grew heavier.

Play, the Best Exercise of All.—Play, among children, is the natural way of getting exercise and developing the muscles. A baby plays with its toes. Young animals, puppies, and kittens have the same play instinct, and it helps them to become quick and strong.

We have found out that strong muscles depend on good health in the other parts of the body.

ON THE PLAYGROUND

What game do you think these boys and girls may be playing? They know that exercise in the fresh air helps them to win in the game of health.

Good food at regular times, long hours of sleep, fresh air, regular habits of cleaning out wastes from the intestines—all these are necessary for the athlete in training. The rule works both ways. Food makes good muscles, but good use of those muscles helps digestion.

Exercising the muscles not only strengthens the muscles themselves, but it also helps all the other parts of the body. When you run a race or take some other active exercise, you breathe more deeply, your heart beats faster, and the blood flows more swiftly through the different organs. Because of the exercise, your appetite is better and your sleep is sounder. Exercise is needed, not only for strength, but also for the health of the body as a whole.

Some Things to Remember as You Exercise.—Roller skating, bicycle riding, ice skating, coasting, baseball, prisoners' base, all sorts of running games, swimming, tree climbing, and long walks—these are the things that make the muscles grow strong and the cheeks rosy. These are the things that keep the heart and the lungs in good condition.

Above all, games that children can play together are good. Such games, in which one team challenges another team, not only develop physical strength but also teach us how to do our best, not for ourselves but for the team, and to work side by side with others for a common end.

Proper clothes for games and hikes help to insure pleasure in exercise. Light-weight clothing and proper shoes are necessary for real outdoor comfort.

Muscle soreness may develop after hard exercise if practice has been neglected. Such soreness can usually be cured in a day or two by gentle exercise, which will increase the blood flow through the painful muscle. Sometimes accidents occur in which the **ligaments**, or cords which join the muscles to the bones, are strained, twisted, or partly broken. We call such an accident a sprain. When the ends of the bones which form a joint are wrenched out of place, a dislocation results. In this type of accident, the ligaments are usually sprained at the same time. Later on you will learn how to give first aid for sprains and dislocations. As a rule, they soon heal if properly treated.

If we want to be strong and well, we must not only do all we can to develop our bodies by exercise, but we must also avoid anything that will directly harm them. There are many bad habits which may injure the health. Sitting up too late at night to listen to the radio, going too often to the movies, eating too much or too little, and nibbling at candy between meals are examples of habits you may form which injure your health and strength. Among grown people, there is one habit of this kind which is more harmful than perhaps any other—the use of what are known as alcoholic drinks, such as whiskey, brandy, wine, ale, and beer. The alcohol in these drinks is a poison. Some of them have only a little alcohol, but others have a great deal.

Studies made by scientific men in recent years have shown that even small amounts of alcohol make people less able to do physical and mental work. Men who play football or baseball or who take part in any other competitive sport at college are forbidden to use alcoholic drinks while they are in training so that they may render the fullest service to their teams.

BOY SCOUTS WHO WENT TO AFRICA

These three American boy scouts were chosen to accompany the Johnson expedition to Africa in 1927. One of their qualifications was physical fitness. (*P. and A. Photo*)

A Joint Committee on Health Education, made up of doctors and teachers, has drawn up the following standards for children of the fourth, fifth, and sixth grades in regard to games and sports:

1. Should spend at least three hours daily in active out-of-door play.
2. Should be able to assume good posture upon request; should be willing to accept help in self-corrective exercises.
3. Should be interested in motor ability tests for running, jumping, throwing, bathing, and climbing, and ready to compete with other children.
4. Should enjoy vigorous folk-dances.
5. Should be willing to play fairly.
6. Should have established "Rules of the Health Game," and should know the value of keeping them.

These are the standards we should meet in order to have bodies that are strong and handsome, fit for play and for service.

The three American boy scouts in the picture on page 147 were chosen to accompany Johnson's expedition to Africa in 1927. Among their qualifications were well-trained muscles, able to meet the standards above.

Get Ready for the Work of Life.—Games, played in the spirit of real sportsmanship, give the best of training for the game of life. We have seen how Washington built up a strong body by his hardships in the wilderness. Lincoln, as a young man, was a famous wrestler, who was said to be able to throw any man in his part of the country. Roosevelt, by constant training, changed himself from a rather sickly boy into a vigorous hunter and sportsman.

BRIDGE BUILDERS

The men who mine coal and iron, who make steel, and who build tall buildings and bridges must have strong, well-trained body machines. (*Underwood & Underwood*)

We do not fight Indians in these days. We cannot all hunt lions in Africa. But there is still plenty of work to be done that needs strong and healthy bodies. In war time, men must still be ready to defend their country. In peace, there is work to do that is even more important. Much of the coal that keeps us warm in winter, runs locomotives, and drives the machinery in factories, must be dug out of the mines by human muscle. In other mines, men are getting the iron from the earth. In the factories, the iron is made into steel—the steel that builds our tall city buildings and our railroads. The tall buildings themselves must be built, and the railroads must be laid, and when they have been finished, the snorting locomotives must be driven over them, pulling long trains of cars. The men who do these things must be strong in muscle, and they must be brave as well as strong.

All of you owe it to your country to be as strong as you possibly can be, and to develop all your muscles so that you will be ready to do the work of life successfully and well.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. How do you define the word *exercise?*
2. Name at least five good results of active exercise.
3. What causes muscle soreness? How should it be treated?
4. Can you repeat the six Games and Sports Standards for boys and girls of your grade?

Try One of These Suggestions:

1. Make a list of the kinds of work which boys' and girls' muscles can do. Write *O* after the kinds which can be done out of doors in the country. Write *C* after those which can

be done in the city. Do country or city pupils have more interesting opportunities to make their muscles work?

2. List the out-of-door winter games and sports played by the members of the class. List the summer ones. Which of these can be played at school or in your neighborhood?

3. Show in the following way the value of machines in helping to do work: Fasten spring scales to a heavy chair and pull it across the floor. Record the number of pounds of work needed to move the chair. Now place the chair on a little coaster wagon and pull it with the scales. Again record the number of pounds of work. How many more pounds of work were needed to move the chair without the help of wheels?

4. Have each member of the class write an unsigned record of his or her active work and play the day before. Then have a committee examine the papers and report the number who worked or played out of doors. The committee may also report the greatest, the least, and the average amounts of time spent out of doors. Do these reports show that the boys and girls believe that daily outdoor exercise is a good health habit?

Discuss These Problems in Class:

1. Recall what you have learned about the outdoor work and games of the people in different countries as you have read about them in geography. Find out what you can, from a book of history stories, about the outdoor life of the ancient Greeks and Romans. Do these people seem to have had opportunities for outdoor life as good as the opportunities of the members of your class?

2. What is the relation of food to the building of good muscles and to the actual work of the muscles? Refer to Chapters IV and V.

3. What habits interfere with the health and strength of the muscles? In what way?

CHAPTER XV

HANDICAPS TO HEALTHY LIVING

Good and Bad Habits.—Throughout this year's course in hygiene we have been chiefly concerned with the various things one should do in order to play the game of healthy living well. Good habits, with regard to diet and fresh air, exercise, posture, and cleanliness, are essential to happiness and success. In Chapter XIV we have considered very briefly certain bad habits which should be avoided. There are some things one *should* do to keep fit and well—good habits one should cultivate. There are also things one *should not* do—bad habits that must be avoided if one is to win the game of health. Among the most important of such dangers to health are certain harmful foods and drinks which some people form the habit of using by imitating someone else or because the foods or drinks are thought to be pleasant, but which in the end do harm to the body and rob the user of the pleasure and satisfaction of winning in the health game. The use of tobacco is a habit which may often prove a similar handicap.

In Chapter VII we have considered two drinks, tea and coffee, which are relatively harmless for grown-ups but very bad for the growing child. Much more dangerous are those drinks which contain alcohol, such as beer, wine, whisky, etc. The use of these liquors is harmful for people of any age. The question is so important that even at the very beginning of a study of hygiene one should learn something about it in order to understand why alcohol is frowned upon.

What Alcohol Is.—"Alcohol" is really a general term, like "starch" or "sugar," which includes a whole class of chemical substances. When we use the word in ordinary conversation, we usually mean one particular kind of alcohol which the chemist calls "ethyl alcohol." It is this kind of alcohol which is found in wines, beer, and stronger drinks and which gives them all their quality as intoxicating liquors.

The source of alcohol is a rather curious one. It is originally formed in the process of **fermentation,** a term applied to the decay of sugary liquids in grain or fruits. If, for instance, apple juice or grape juice is allowed to stand, tiny germs called **yeasts** grow in it, somewhat as do the molds which sometimes spoil jelly. As these yeasts grow, they get their food from the sugar of the apple or grape and change it into other substances. From the sugar they form a gas (carbon dioxide) and alcohol. So that the alcohol in wine, cider, beer, and other alcoholic drinks is really a waste product formed by the germ of yeast in its action on the sugar. Of course many other changes take place while the fermentation is going on and other substances are formed which produce particular flavors, but the alcohol is the product which gives these fermented liquors their chief characteristic.

A YEAST COLONY

How living yeast cells appear when examined through a microscope. (*J. Jay Hirz*)

The amount of alcohol in fermented drinks like wine and beer is not very great (usually under 5 per cent for beer and under 15 per cent for wine). When the alcohol content reaches between 15 and 20 per cent, it kills out the yeast and fermentation consequently stops. Stronger alcoholic drinks such as gin, brandy, and whisky are prepared artificially from the weaker solution formed by yeast-fermentation. Alcohol boils at a lower temperature than water. If, then, an alcoholic liquor is heated, the alcohol is driven off first as a steam or vapor and can be collected again by passing the vapor through a tube which is kept cool. This process of heating and condensing again by the use of a "still" is called **distillation** and is used in the manufacture of the strong **distilled** liquors which may contain forty per cent or more of alcohol.

Is Alcohol a Food?—We have learned in earlier chapters that the body needs foods of various sorts to supply it with fuel for energy, with body-building substances, and with peculiar protective substances called vitamins. Has alcohol any special values that should give it a place in the list of useful foods?

Alcohol has no protective value and no body-building value, since it contains neither proteins, salts, nor vitamins. Like the starches and sugars, it can be used as a source of energy, but it cannot be stored as a reserve in the body as starches and sugars can, for when taken into the body it is "burned" up at once. Alcohol in its cheapest form is about eight times as expensive as bread for the same amount of fuel energy. Nor are any of the other substances in fermented liquors, aside from the alcohol itself, of any important food value. The United States Brewers' Year Book for 1913 expressed the facts as follows: "Chemists and brewers admit that practically the food value of alcohol and even of beer is inconsiderable. The quantity necessary to nourish the system would be so large as to act as a poison."

Dr. Haven Emerson of Columbia University has summarized the matter as follows: "Alcohol is not included in the list of some thirty-seven food essentials known to be desirable to insure healthy growth and activity of the human body. . . . This is because alcohol . . . is in no sense, under conditions of health, necessary or desirable as a food. It is never, except from ignorance, included among the foods of children's diet. It is almost universally excluded from the diet of persons devoted to athletic excellence or to skill requiring a high degree of rapidity, accuracy, or endurance of muscular response to the brain. It is not advised by physicians as an article of diet for healthy persons of any age, and when it is used under medical direction, it is added to the diet for its drug or medicinal properties more often than as a food."

Alcohol as a Drug.—Alcoholic drinks have, then, no real value as foods. Alcohol is primarily a drug, not a food, and is used for its drug effects.

By a "drug" we mean a chemical substance which changes the behavior of some of the organs of the body. Eating a good meal, plunging into a cold bath, or taking vigorous exercise, alter the behavior of the heart, the blood vessels, and other organs, but these are natural influences which form a desirable part of all our daily lives. Drugs are chemical substances which we do not consume under natural conditions; and their action is more powerful than that of any proper food or drink. Drugs are of value only when used for sick people under a doctor's advice to cause some special effect which is needed; and it is clear that they must be used with great caution.

There are two common classes of drugs called **stimulants** and **narcotics.** Stimulants speed up the action of the heart or some other part of the body while narcotics slow down some part of the body. Alcohol belongs to this latter class. It affects chiefly the brain and nerves which control the working together of all the parts of the human machine. It tends always to make the person who takes it less alert, less competent, less alive in the true sense of the term. An English report on the action of alcohol on the human body says: "The first effect generally noticed is a slight giddiness or 'light headedness'; this is followed by an increasing heaviness and disinclination for all effort, soon passing into sleepiness; and this in turn, if not counteracted by an excitement coming from within or without, gives place to a heavy sleep which continues for many hours."

In the early stages of this drug effect, the person affected may often feel that he is stimulated, but this is never really the case. As Miss Bertha

R. Palmer, former Superintendent of Public Instruction in North Dakota, has said: "When the nerves are affected by this narcotic, they see, hear, taste, feel, and move *less* than usual; for example, if one is tired and takes beer or wine, the alcohol dulls the nerves and in a few minutes the drinker *feels less*, that is, *feels less tired* and thinks he is rested. The effect is the same if he is ill, shy, cautious, worried,—whatever feeling of discomfort is uppermost is lessened and the drinker feels less ill, less shy, less cautious, less worried, and *thinks* he is confident, braver, relieved." Yet all these sensations are really false. "Wine is a mocker."

Even the false sense of well-being soon wears off and is replaced by discomfort. The drinker who takes more and more alcohol becomes physically clumsy and mentally confused. He drops things; he walks unsteadily; his speech is blurred; he becomes unconscious of what he is doing; and finally, he falls into a heavy sleep which continues until the drug has been eliminated from his system.

Alcohol as a Poison.—Almost any drug, when used in too large amounts or for too long a time, becomes a poison—that is, it is actively harmful to the organs of the body. It is obvious, of course, that the person who has taken so much alcohol that he staggers in his walk and does not know clearly what he is doing, is for the moment poisoned. If the dose is still greater so that he becomes unconscious, the poison effect is acute and severe; and in very extreme cases this sort of acute poisoning may result in death.

It is not so well recognized that the steady use of a drug even in relatively small doses which do not produce obvious effects at the moment may, in the long run, damage the body very seriously. Yet this is especially true of alcohol. If one uses alcoholic liquors regularly in considerable but not extremely large amounts, there may be no signs of intoxication at any time. Yet the repeated doses of alcohol may be causing gradual changes in the various parts of the body which amount to a slow poisoning. The brain and nervous system may be altered so as to affect the whole personality. The stomach and liver may be affected and so may other organs. These changes may be so serious as to remain even after the use of alcoholic drinks has been given up and may in the end lead to serious and even fatal results.

Aside from the brain and nerves, some of the worst effects of the immoderate use of alcohol are those exerted on the digestive system. The delicate lining of the stomach and intestines is very readily injured by the action of alcohol, and many of the injuries to other organs of the body which occur in severe alcoholism are probably due to the fact that the damaged digestive system permits other poisons to come into the system.

The liver is another organ of the body which is particularly subject to the effects of alcohol. In a given community, the death rate from diseases of this organ has been shown to go up and down with increases and decreases in the consumption of alcoholic liquors by the community as a whole.

Less direct, but quite as important are the effects of alcohol on the number of deaths from accidents, from certain diseases like pneumonia, and from exposure to heat and cold. Accidents in factories or in the driving of automobiles are obviously likely to occur when the worker or the chauffeur is under the influence of liquor. Resistance to germ diseases such as pneumonia is greatly reduced in the steady drinker. The use of alcohol increases the danger of sunstroke; and since it tends to enlarge the blood vessels of the skin and thus increase heat loss for the body, it also makes exposure to cold more dangerous. The person who has taken a drink of alcohol *feels* warmer but is really losing heat more rapidly. This is another instance of the fact that "wine is a mocker."

The Effects of Tobacco.—The habit of smoking is much less dangerous than the habit of drinking, but it also may prove a real handicap in the game of healthy living. Here, as in the case of alcohol, athletic coaches nearly always forbid smoking to the members of their teams, which is an indication of the fact that tobacco is a foe to real efficiency.

The effects of tobacco are more difficult to determine than in the case of alcohol. The chief poison present in the leaves of the tobacco plant is nicotine, but in the process of preparing tobacco and in its actual burning, many other substances are produced, some of which are poisonous.

WHERE EFFICIENCY COUNTS

A single member, made unfit by alcohol, would prove a grave handicap to a racing crew, for he would mean a lack of coöperation and hence of the machine-like efficiency which rowing requires. (*Wide World Photos*)

When first used tobacco plays the role of an active poison causing pallor, dizziness, faintness, sweating, palpitation, muscular weakness, and collapse. Repeated use develops a resistance to nicotine so that the habitual smoker shows no such pronounced symptoms. The first effect of smoking on such a person is a slight stimulation. The amount of sugar in the blood goes up and heartbeats and blood pressure increase. The secondary effects are of an opposite kind. The nerves controlling the blood vessels are affected so that their operation becomes less efficient. There is no ground for the belief that smoking " stunts growth "; but it certainly affects the nerves so as to cause a marked decrease in accuracy of movement. Furthermore, the hot smoke irritates the delicate tissues of the throat and often causes " smoker's sore throat " and " tobacco cough."

Alcohol and Tobacco as Handicaps.—No one can use alcohol in any degree at all without a certain distinct loss of efficiency—for a time at least. You know how in certain sports some competitors must give " handicaps," which represent extra loads they have to carry in competition. A very fine golfer, for instance, may give a handicap of fifteen strokes to a poor one. Then if the good golfer goes round in 86 and his opponent in 100, the poorer player wins. As we all play the game of life, the man who uses alcohol gives a handicap to the man who does not; and he may lose the game as a result.

The same general principle applies to the use of tobacco. An experiment was made with twelve baseball players, some of whom smoked habitually while others did not. Their accuracy in throwing a baseball was recorded before and after smoking. One cigar decreased efficiency from 11 to 13 per cent and two cigars from 11 to 18 per cent. Habitual smokers as well as nonsmokers were affected, but in less degree.

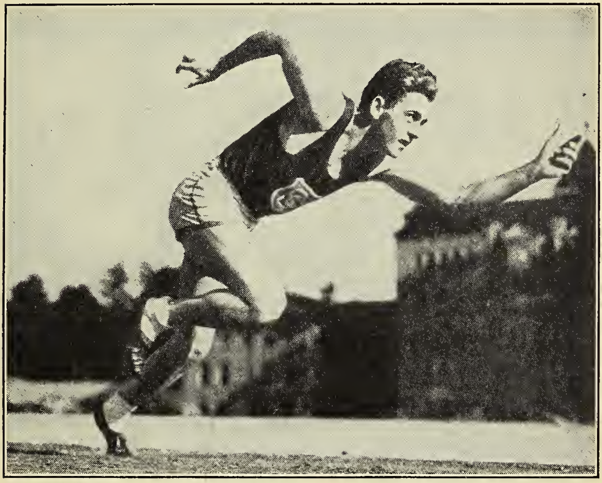
The evidence is overwhelming that alcoholic drinks even in the most moderate amounts decrease physical and mental efficiency. Miss Bertha R. Palmer quotes an experiment made by Dr. Parkes, an English army surgeon. "He (Dr. Parkes) engaged a number of soldiers to do a certain work, during which each man was to be paid for what he accomplished. The men were divided into two gangs, alike in age, constitution, and other conditions. The food given the two groups was alike, as was the work they had to do. There was but one vital difference—one gang was given beer to drink when they wanted it, the other gang drank water. At first the beer gang forged ahead, but as the day wore on, they became slower and slower, until at the end of the day they were far behind the water group. The following days were the same. Because the water drinkers were doing more work, they were receiving more money. Finally Dr. Parkes transferred the entire groups; the former water group was given beer, and the former beer gang now had only water. The situations were reversed; those in the former beer gang now did more work and received more pay, and the other men fell behind."

The same principle holds with regard to mental work. Dr. W. R. Miles of Yale University some years ago made the following experiment. Six young men typists were used as subjects for a test of the effect of alcohol upon their skill. Every day they were given a drink which sometimes contained alcohol and sometimes did not. The drink was flavored so that they could not tell whether the alcohol was present on a particular day. Very delicate measuring instruments showed that on the alcohol days, their fingers moved more slowly and their eyes glanced less quickly across the pages which they typed. The greatest difference, however, as one might expect, lay in the accuracy of their work. On the average as a group they made 39 per cent more errors on the days when they were given alcohol than on the days when they were not.

Well might Sir Andrew Clark, the famous English surgeon say, "Every man who comes to the front of a profession is marked by this characteristic, that the more busy he gets the less in the shape of alcohol he takes, and his excuse is, 'I cannot take it and do my work.'"

Our Attitude toward Alcohol.—In summary, then, alcohol may, in a very limited sense, be thought of as fuel, but it has no real value as a food since it is very costly as a source of energy and contains none of the real essentials of a food, such as proteins, salts, and vitamins.

It is essentially a drug and its principal action is a narcotic one, putting to sleep the higher controls of the nervous system. The temporary feeling of well-being is wholly deceptive since it arises not from any real increase of power but merely from a deadening influence upon the consciousness and a consequent lack of self-control.



THE RUNNER

The athlete abstains from taking drugs of any sort. Can you name some of his needed physical qualities which alcohol and tobacco would affect? (*Ewing Galloway*)

Taken in quantity, alcohol is not only a drug but a poison. In considerable doses it leads on from loss of nervous and muscular control to stupor and—in extreme cases—death. In smaller repeated doses it works serious damage to the digestive system, to the liver, and, indirectly, to various other organs of the body.

Even in the smallest amounts, alcoholic drinks tend to decrease efficiency. They also tend to make physical movements less accurate and precise; and they affect, in even greater degree, the mind itself which controls all our activities. The athlete, the factory worker, the typist, the soldier, the business man, is hampered and handicapped in his activities precisely to the extent that he makes use of alcoholic liquors. The higher one goes in the scale, the greater is the importance of temperance.

Plato, the great Greek philosopher, said of the use of wine: "I should prefer the Carthaginian law to the effect that nobody while on military duty must even taste this drink, but must keep entirely to water the whole time; that in the city no slave, either male or female, must taste wine at any time; nor the presidents during their year of presidency; nor the helmsmen, nor the judges when on duty; neither must any one do so who is taking part in any deliberation of importance."

There is one particularly serious feature of the alcohol and tobacco question which has not yet been mentioned—the danger of developing the habit of dependence on these harmful drugs.

Many people think they can experiment with alcohol and use it in moderation. The difficulty, however, is that one drink of alcohol tends to lessen self-control and to make it less easy to stop before the second. The man who has grown to be dependent on the forgetfulness produced by the narcotic effect of this drug may in the end find it very hard indeed to give up the habit. The safest and easiest place to stop is before one begins. The Japanese have this saying: "A man takes a drink, then the drink takes a drink, then drink takes the man." The use of tobacco has a very similar tendency to develop as a habit, hard to break and becoming more excessive each year.

We all want new knowledge and new experience. In choosing experiences, however, it is wise to be guided by the experience of others. When we are walking in the woods, it is foolish to take paths which have been found to lead nowhere. The alcohol and tobacco paths are of this kind.

What we want is life and strength and power. We want to live splendidly, not merely to dull our sensibilities with a drug so that we think we are living splendidly. The only excuse for the use of alcoholic drink is that a man is so discouraged and disheartened that he wants to forget. It is a surrender, a running away from life, not a victory. No one who has normal health and intelligence and plays the game of life to win needs such an escape from its responsibilities and opportunities.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. What is the original source of alcohol?
2. How are the stronger alcoholic drinks manufactured?
3. What can be said about the food value of alcohol?
4. What is a drug?
5. Explain the difference between stimulant and narcotic drugs.
6. What is the effect of alcohol on the nervous system?
7. What is the effect of alcohol on the digestive system?
8. What happened to the two groups of English soldiers, with and without the addition of beer to their diet?
9. What is the effect of alcoholic drinks on typewriting?
10. What do you understand by the term "alcoholism"?
11. What are the effects of tobacco on the human body?

Try One of These Suggestions:

1. If there is a microscope in school or one that can be borrowed, look at yeast cells (from a yeast cake) under it.
2. Study the use of yeast in brewing and in baking. What is its action in each case?
3. Look up the subject of drugs. What are some of the most important drugs and what is the action of each?
4. Review the history of Federal legislation at Washington and of legislation at your own state capital with regard to the consumption and sale of alcoholic drinks.
5. Find out what the American Indians called alcoholic drinks. Discuss the significance of the term.
6. Find out what athletic trainers think of the use of alcohol and what rules in regard to it they enforce on their teams.
7. Find out who Plato was, when he lived, and for what he was distinguished.

Discuss These Problems in Class:

1. Review the whole question of foods and food values. What do we get from various foods and how valuable is alcohol in relation to such foods as bread and milk?

2. Discuss the relationship between drugs and poisons. When are drugs useful and under what conditions should they be used?

3. Compare the drug effects of coffee, tobacco, and alcohol. How do they differ?

4. Organize a debate on the use of alcohol. What are the assets and liabilities? What should be the policy of the individual toward the use of alcohol? Of the community?

CHAPTER XVI

SAFE AT HOME

Getting Safe Home.—You have often heard and read about the pioneers who cleared and settled our country and made it a good place to live in. The forest was all around them, and at first they were in danger whenever they went into it. There were often wild animals, sometimes there were unfriendly Indians, and there was always the danger of getting lost—missing the trail. After a while the pioneers found out ways to guard themselves, so that they could move about safely. They trained their eyes and ears to be alert, and they learned to understand the meaning of what they saw and heard. They read the forest signs and obeyed them, although the signs were not printed ones. Of course they carried guns, but they knew that a gun was of little use to a man who was careless or unobservant, or who did not know the forest. No doubt even the bravest of them was glad to be "safe at home" after a forest journey.

On your way home from school this afternoon, you are not likely to meet either Indians in war paint or bears. You will probably meet a good many automobiles, however; and automobiles kill more people in a week than the Indians ever did in a year.

If you are to play the game of life well, you must have some of the qualities that helped the pioneer. First of all, you must have courage, for people who are easily frightened often get confused and do foolish or dangerous things. Another important quality is skill—knowing the right thing to do and how to do it. Finally, you must train your eyes and ears to alertness; they must be ready to warn you of danger. It is part of the game of life to know how to work and play both in safety and in comfort.

Safety in the Street.—Even in such a simple matter as getting home from school, there may be dangers and adventures. Each street you have to cross presents a problem in safety. Here you are on one sidewalk. Across the way is the opposite sidewalk, which you want to reach. The roadway lies between, and along it are passing powerful cars and trucks, in a long, swiftly moving line that seems as if it could never be stopped. Even more dangerous, the roadway may seem clear, with nothing in sight at the moment; but you know quite well that a huge car may come whizzing by at fifty miles an hour before you can get across.

The best of the pioneers would look grave if you showed him your safety problem, for his forest knowledge would not help him to solve it. You, however, can very easily find out what to do and how to do it. There are plain signs to guide you, if you will learn what they are and follow them. The police of your town or city have made **traffic rules** to protect all the people who use the street, and those who walk must keep them as well as those who ride. If you are to move about safely in your town, you must know its traffic rules and obey them.

Though the traffic rules are slightly different for different towns and cities, they are all planned to keep traffic moving as quickly and safely as possible. To solve your safety problem of crossing the street, they set aside certain places—crosswalks—where, at certain times, it is safe to cross. In a large city there are usually signals at these crossings to tell you when to go, and at very busy places there is a traffic officer as well. Where there is less traffic, no special signal may be needed and people who cross must choose a safe time.

Where the traffic is controlled by a light or a traffic policeman, your safety rules are easy. Cross only when the signal light ahead of you is green, or when the traffic officer motions to you to come on. If there is no light or traffic officer, then you must look carefully each way and cross only when there is no car coming from either direction. That is, you must depend on your own eyes and ears. If a street car, a van, or a line of parked cars is standing so that you cannot see what traffic is coming up on the other side of it, do not dash out hastily across the roadway. Look around the end of the standing car to make sure that the way is clear.

Besides the traffic rules which are made for you, there is one that you should make for yourself:

MR. SIMPLE, ON HIS WAY
TO WORK UPON A RAINY DAY,
IN HIS EFFORTS TO KEEP DRY
POKES HIS NEIGHBOR IN THE EYE,
WHILE THE CHAUFFEURS, IN A FRIGHT,
TRY TO DODGE HIM, LEFT AND RIGHT.

ARE YOU A SIMPLE?

(*Courtesy of the National Child Welfare Association*)

Never step into the roadway for any purpose, except at a crosswalk.

This means, of course, no "jay walking" or wandering across the street anywhere between the crossings. It also means that you will not play in the street, or steal rides behind vehicles, or rush into the roadway after a ball.

If you live in the country, the roadway may perhaps be the only place to walk. Here, too, there is a safety rule which you can learn and keep: Walk on the left-hand side of the road. Walking at the left-hand side, you can always see a car coming in time to step out into the grass and let it go by.

Remember always the pioneer rule of alertness. You must keep your eyes and ears on the job. Even when you are keeping traffic rules, other people may not be. Watch out, and give such careless and foolish people no chance to injure you. When you are on the highway is no time to let your mind go "woolgathering" or to get so greatly interested in talk that you forget where you are. "Cross crossings cautiously." You may be quite sure that nothing you have to do is so important that you can afford to risk your own life or someone else's in order to cross the street two minutes sooner.

Safety in Conveyances.—If you go home from school in a street car or in the school bus, you will find, even there, many chances to solve safety problems. In getting on a street car or a bus, for instance, you should use the right hand and the left foot; in getting off, use the left hand and the right foot. There are good reasons for these two rules. Try to think them out for yourself. if you do not already know them. Experiment at home, and try out various ways of stepping on and off a flight of steps with a handrail. Get the rest of the class to make the same tests, in order to decide

CLOTILDE EMBREE
MRS. SIMPLE, WHEN SHE LEAVES
A STREET-CAR OR A TRAIN,
FORGETS THAT SHE SHOULD FACE THE FRONT.
(THE POOR THING HAS NO BRAIN.)
SHE FALLS—AND BLAMES THE MOTORMAN
FOR EVERY BRUISE AND SPRAIN.
ARE YOU A SIMPLE?
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70 Fifth Avenue - New York
cooperating with
Education Section, National Safety Council
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(*Courtesy of the National Child Welfare Association*)

which way is the most convenient one for most people.

Another important rule is never to get on or off a car or a bus until it has come to a full stop. Whatever your hurry, it is not worth the risk of being badly hurt.

While you are in the car or the bus, look out of the windows if you like, but do not put your head or arms outside; they might be struck by some passing vehicle. Remember, too, that the driver of a bus or a street car has safety problems before him every minute. It is good sense as well as good manners not to disturb him by talking to him unnecessarily or by making too much noise.

Going back and forth to school, and whenever you are with other children, remember that the boy or girl who tries to "show off" by taking needless or foolish risks is not the one who wins respect in the end. The real leader is the one who knows what to do and how to do it; who learns the rules and follows them; who has courage in an emergency but is so alert and skillful in his work and play that an emergency will rarely come.

Safety at Play.—School, playground, and home—these are the three places where you spend your day. You cannot choose your home or your school, but you can decide where to play in the afternoon. This is another chance to show how well you understand the game of life. If you have learned to observe and to exercise your good sense, you will not play in the streets or along railroad tracks or in railroad yards. You will know enough to keep away from hanging wires, because these might be carrying a dangerous electric current. You will not play on steep, dangerous banks of earth or rock, or in places where you might fall into deep water. If you go on the water in a boat or a canoe, you will never stand up or move about carelessly; you will never change places with another child except when it is necessary to do so; and you will never, in any circumstances whatever, "rock" even the safest boat.

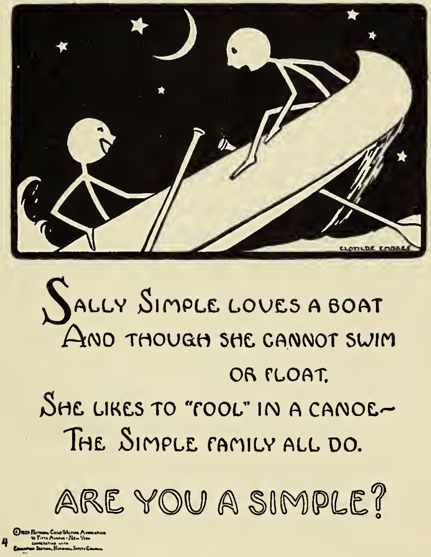
In play, too, there are safety rules, and these are generally rules of ordinary courtesy as well. It is certainly not good manners to shove a playmate, or to trip him, or to throw something at him; and it may be dangerous, as well. Have you ever wondered why children do things of this kind? Generally it is because they hope to attract attention and to be noticed and admired. The desire to be "popular" is harmless, though rather foolish; almost all children and many grown-up people share it. But rough and unkind jokes, while they do attract attention to the joker, do not make sensible people like or admire him. The sure roads to the respect and liking of one's companions are quite different. To say and to do the right thing; to do things in the best possible way; to be a "good sport" whether you win or lose; to think of other people as well as of yourself—these are marks of the good player in the game of life.

Home Safety.—*Home* and *safe* are two words which seem to belong together. After a journey or an adventure we say that we have "come safe home," as if home were a place where there was nothing to guard against.

But how safe is your home? The people who study accidents, in order to find out where, how, when, and to whom they happen oftenest, tell us that many homes are not very safe. The automobile, of course, is the greatest cause of accidents in this country. It is responsible for nearly one third of all accidental deaths; that is, for one out of every three. Nearly a quarter of all our accidents (about one out of every four) happen in factories, and almost exactly the same number happen in homes. Strange as it may seem, the home may be as dangerous a place as a factory, with all its great moving machines, its knives and saws and whirling wheels.

One explanation for this surprising fact is that young babies and very old people, who are especially likely to be hurt, spend most of their time at home. If the other people in the house are careless, those who cannot move about easily or have not learned to protect themselves are most likely to suffer. For their sake, as well as for your own comfort and safety, you must try to keep your home as free as possible from all of the many causes of accidents.

The records kept of accidents in homes show that more of them are due to falls than to any other one cause. Uneven places on stairs; stairs without handrails or with weak or broken handrails; carpets or rugs with holes that may catch the toe; loose or wrinkled carpets or rugs; small rugs which slide on polished floors; toys, blocks, balls, and other objects left on the floor, where someone may stumble over them; furniture left out of place, so that someone runs against it in the dark—these are all common causes of indoor falls. They are all due to someone's carelessness or neglect. Another common cause of dangerous falls is the habit of climbing on chairs and boxes to reach something, instead of taking time or trouble to get a stepladder.


CLOTILDE EMBREE
SALLY SIMPLE LOVES A BOAT
AND THOUGH SHE CANNOT SWIM
OR FLOAT.
SHE LIKES TO "FOOL" IN A CANOE—
THE SIMPLE FAMILY ALL DO.
ARE YOU A SIMPLE?
4

(*Courtesy of the National Child Welfare Association*)

Next in importance to falls, as indoor accidents, come burns and scalds. Matches are very useful things to have in the house—in fact we could hardly get along without them—but they can also be very dangerous. Matches should be kept in a closed tin, not lying about loose. If you use the safety matches which come in boxes, be careful never to strike them until the box is closed. If the box is open, all the matches in it may go off at once and start a fire. Keep matches away from younger children altogether. Never throw burnt matches into a wastebasket; keep them in a special place where they cannot start a fire.

Pans of scalding water or pots of hot coffee should be kept out of the reach of little children.

Lights are another thing to be careful about. No lamp should ever be set near the edge of a table. Clothes that are being dried should never be hung so near the stove that they can catch on fire. Oil lamps, candles, or matches are to be kept away from curtains and out of clothes closets. Your electric torch is the thing to use, if you must hunt for something in the evening or in a dark room; it is a most important aid to home safety. Electric lights, too, help you to avoid many risks, though electricity has new dangers of its own. If you are using an electric iron, toaster, or other heating device, be sure that you either disconnect it or turn off the current before you leave it even for a few minutes.

Look back, now, over these causes of accidents by fire or electricity. How many could be prevented by taking ordinary care?

After falls, burns, and scalds, the most common home danger is from cuts and scratches. Broken glass; nails sticking out; sharp knives and scissors left out of place or used carelessly, particularly by young children—all these cause many accidents. You can easily see how careful and orderly habits at home can help safety in this respect.

A Home Safety Survey.—It would be interesting for your class to make a study of safety conditions in your own homes. Just before the spring house cleaning is a good time to choose. Let each member of the class take a pad of paper and a pencil and go into every room, closet, or passage in his house, and then through the yard and outbuildings, noting down as he goes everything that he thinks might cause an accident.

In each room, closet, or passage, look for any of the conditions mentioned in this chapter as likely to cause accidents. Some of them, such as toys on the floor, furniture out of place, rugs that are not smooth, you can put right at once and can undertake to watch out for in future. If you find other things that you think dangerous, talk them over with your mother and father and see what they suggest.

To close up the survey, all who wish may bring their lists into class and discuss them. It will be interesting to discover the kinds of danger found in different homes and to compare the progress made in removing them.

Your Responsibility.—Your home belongs to all who share it, and each one of the household has his own responsibility for keeping it safe. Children as old as you are can do a great deal for home safety by remembering to be careful, orderly, and alert. You are also old enough to help your younger brothers and sisters learn to play the safety game. Put what you have found out about home safety into simple story form for eight-year-olds to read. Make a series of posters showing careful ways of handling matches, knives, scissors, and the like, for use in the lower grades, where the children are just beginning to learn about safety. People of all ages must learn to work together if streets and homes are to be made safe for all of us.

AFTER STUDYING THIS CHAPTER

Check Yourself by Answering These Questions:

1. What safety rules that helped the pioneers are still useful today? What dangers have we that they knew nothing about?
2. What are the rules to follow in crossing a roadway?
3. What should you do in getting off a street car?
4. What proportion of all accidents occur in homes?
5. List seven conditions in the home which are likely to cause falls.

Try One of These Suggestions:

1. Get a copy of the rules which govern motor traffic in your city. Watch at a street corner near your home or school, to see how closely these rules are obeyed.
2. Find out what accidents have occurred in your family or in the families of your friends during the past few months. How serious were they? What, if anything, could have been done to avoid each of these accidents?
3. Find out what policemen do to prevent accidents, and what firemen do to prevent fires, in your community.

Discuss These Problems in Class:

1. What are the rules for fire drill in your school? Discuss the reason for each.
2. Make a list of places in your neighborhood where school children play. Discuss the possible dangers of accident in each and give it a safety rating—excellent, good, fair, poor, very poor.
3. Discuss the question of practical jokes. Can you recall any which might have caused accidents? How can the class discourage them?
4. Make a program for helping to develop safe practices among the younger children of your school.

CHAPTER XVII

OUR HEALTH DIARIES

Interesting Diaries.—Since the beginning of the term you have been writing in your health diaries about the different things you do to help yourselves "look alive." Each diary tells a different story, and each one of you feels, of course, that your own diary tells the most interesting story of all.

"Look Alive" Charts.—Your diaries tell of many things which you do now to help yourselves look alive, and most of you will want to make yourselves look even more alive in the future. If you make a "Look Alive" Chart like the following one, it will help you to decide what progress you are making in trying to "look alive." The first column tells what you *used* to do; the second column tells what you do *now;* and the last column tells what you hope to do in the *future* to improve yourself. You may wish to add some things to your own chart or to leave out some which are suggested here.

Write "yes" or "no" in each of the three columns after each question, then count the number of "yes" answers in each column, and record the numbers at the end of the chart. This will give you an idea of how you are progressing.

"LOOK ALIVE" CHART

	I used to do it	I do it now	I hope to do it
I. Exercise to Help You Look Alive.			
Do you play outdoors every day and do you play hard? (Or indoors with windows wide open?)			
II. Posture to Help You Look Alive.			
Do you walk and stand with toes straight ahead?			
Do you walk and stand with abdomen flat?			
Do you walk, stand, and sit with chest up and head up?			
Do you try to sit in seats not higher than 2/7 of your own height?			
Do you sit with hips well back in your chair?			
III. Sleep and Rest to Help You Look Alive.			
Can you finish each day without feeling tired and cross?			
Do you get to bed before nine o'clock?			
Do you sleep 9 or more hours each night?			
Do you sleep with your windows open?			
Do you feel keen and rested each morning?			
IV. Meals to Help You Look Alive.			
Do you eat 3 meals daily and at regular hours?			
Are you always hungry at mealtime, so that you enjoy your food? (No candy or sweets between meals to spoil your appetite)			
Do you wash your hands and face before each meal?			
Do you have milk at every meal? (No tea or coffee to crowd out milk)			
Do you eat one or more fresh fruits every day?			

"LOOK ALIVE" CHART—Continued

	I used to do it	I do it now	I hope to do it
IV. Meals (*Continued*)			
Do you eat one or more fresh vegetables every day?			
Do you enjoy eating vegetables and drinking milk?			
V. Water to Help You Look Alive.			
Do you drink plenty of water, usually 4 or more glasses each day?			
VI. Cleanliness and Neatness to Help You Look Alive.			
Are your teeth clean and shiny, free from all film and stain?			
Do you have a regular, comfortable bowel movement at least once a day?			
Do you take 2 or more baths each week?			
Do you wear clean, neat school clothes? (Heavy sweaters and coats removed in school)			
Do you have a clean handkerchief daily, and do you use it properly?			
Are your hands and finger nails clean and neat? (No bitten nails)			
Is your hair clean and glossy?			
VII. Other Things to Help You Look Alive.			
Have you gained in weight, one or more pounds, during the past 3 months?			
Are your teeth in good condition, with no decay? (Recently approved by your dentist)			
Are your arms well tanned from playing in the sunshine?			
Total "Yes" Answers			

Past Date____________________

Present Date____________________

Future Date____________________

"Exercise Is Health."—Exercise appears at the head of your chart and reminds you that boys and girls at play certainly do look very much alive. Robert, a fifth-grade boy at the Brookville School, thinks it is particularly important. Robert had been asked the question, "What is health?" He answered, "Health is exercise," and he explained what he meant by saying, "When I play outdoors, I get thirsty, so I drink plenty of water; and I'm hungry, so I eat the right foods; and at night I'm sleepy, so I get to bed early; and then I feel fine and healthy!"

Certainly that sounds as though he must have looked very much alive.

Play Day on May Day.—Last year, at the Brookville School, Robert and his classmates were invited to join another class for a Play Day on May first. They arranged to spend the afternoon in a park where they had plenty of space for games. They had relay races, ball games, and athletic tests. The boys and girls were all divided into "color" teams, each group with arm bands of a different color, and they spent a jolly time playing together. Special tests were also arranged for the ten boys and the ten girls who had the best health records for the year.

The May First Play Day at Brookville was voted a real success, and Robert's class decided to invite the whole school to join them another year.

AFTER STUDYING THIS CHAPTER

Try One of These Suggestions:

1. Make your own "Look Alive" Chart, and decide whether you are doing the things you think are most important in helping you to look alive.

2. Make a special list of things which you might do, but which you are not doing now, in order to help yourself look alive. Plan ways and means of doing at least some of these things.

3. Plan a May First Play Day in which you can invite another class to join. Be sure to plan for games which your guests know how to play.

4. Consider whether you think it would be possible to choose the ten healthiest boys and the ten healthiest girls in your class. How would you have them chosen?

CHAPTER XVIII

EVERY DAY A PLAY DAY

Playing for Health.—You have learned that the game of health calls for plenty of play outdoors in the sunshine and fresh air. Perhaps that play will be swimming or hiking in summer, or skating or coasting in winter. But often the play you enjoy most is found in games—tennis, baseball, basket ball, soccer, hockey, and many others.

In this chapter you will find some suggestions for games, stunts, and exercises to try on your playground. Some of them may also be used indoors, in a playroom or even in your own classroom. You will find that some of them will help you to become skillful in playing soccer or basket ball or other games, later on.

In successful playground programs everyone plays and everyone finds out how well he can play. When classes are divided into color teams, it is easy to get everybody into the games and sports. Arm bands or badges cut from bright-colored pieces of paper cambric may be used to mark the teams. Eight is a good number for a color team, but there may be as many as twenty players. For a special play day, when other classes are invited to join

in the games as guests, color sashes add much to the gay appearance of the playing field.

To help each of you find out your athletic ability, some simple tests are given in this chapter. Separate tests are given for boys and girls. You will find that most of the games require speed and accuracy such as the tests call for.

Only simple, inexpensive playground equipment is needed.* Most classes can provide:

2 playground balls (9 to 12 inches in diameter) or 2 basket balls.

1 volley, or practice, ball.

4 to 12 Indian clubs (or wooden blocks, 2 by 4 by 12 inches, whittled off at one end).

12 or more bean bags.

1 volley ball net, or 30 feet of rope with streamers.

1 tape measure, 10 feet long.

Lime or sand, to mark circles or goals.

1 or more whistles for leaders.

1 yard each of red, blue, white, green, and yellow paper cambric, for badges or arm bands.

4 or more color flags on 20-inch sticks, one to match each color team.

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* See *Games and Equipment for Small Rural Schools*, Physical Education Series No. 8. Government Printing Office, Washington, D. C. Price, 5 cents.

You will find that the playground program will be a great deal more fun if everyone is careful to obey a few rules such as the following:

1. Each group stands in a circle while directions for playing are being given or discussed.

2. Each leader uses a whistle to ask for silence and to start or stop the game.

3. All the players wear suitable clothes, so as to be able to play comfortably. Scout clothes or bloomer suits and tennis shoes are desirable.

4. Playground groups may be divided into teams by counting by twos, threes, or whatever number of teams is required, and then assigning a color to each team so chosen. If preferred, the proper number of badges of each color may be put into a box and mixed, and each player may draw one.

CIRCLE GAMES

In circle games it is easy to include everybody. Some of these games are good for indoor as well as for outdoor activities.

Circle Dodge Ball.—Players divide into three equal color teams, reds, whites, and blues. There may be three or four innings.

In the first inning, the whites and blues join hands to form a circle with the reds inside. The blues and whites try to hit the reds with a practice ball. The reds try to dodge the ball, but as soon as one of them is hit, he returns to the circle and helps in "killing" the other reds. When only three reds are left, the first inning ends and the teams trade places.

In the second inning, the blues are inside the circle formed by the whites and reds, who try to hit the blues.

In the third inning, the whites are inside the circle.

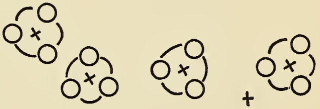
The fourth inning is to find who is the quickest dodger in the class. The last three players left in each of the other innings, nine players in all, are inside the circle, which is formed by all the remaining players. This inning is continued until only one player is left.

Rules. 1. Any dodger is "dead" and must join the circle if the ball touches any part of his body.

2. One throw may "kill" one or more dodgers if the ball bounces from one of the dodgers to another.

3. A thrower may run into the circle to recover the ball and may throw it to one of the players on the circle, but in order to make a "killing," the thrower must have both feet on or behind the circle.

Squirrels in Trees.—Four or more color teams may play. The members of one team are the squirrels, and one member from each of the other teams joins hands to make each tree. The trees should take places on the playground as far apart as possible. One squirrel takes his place in each tree. There should be one squirrel left over. The leader blows a whistle, the squirrels run out to find new trees, the extra squirrel finds an empty tree, and a new squirrel is left over. A tree can hold only one squirrel at a time, and every squirrel must hunt a new tree each time.



The game is played in as many innings as there are color teams, so that the players in each group have a chance to be squirrels. Each inning lasts from two to three minutes.

Center Stride Ball.—All the players but one form a circle. Each player takes a stride position, his feet touching those of the next player. The remaining player stands in the center of the circle with a basket ball or volley ball and tries to throw it between the feet of the players. Players may stop the ball only with their hands. Any player who allows the ball to pass between his feet must take the ball and change places with the center player. If a ball passes to the right side and below the shoulder of a player, that player must change places with the center man. When one of the players forming the circle catches the ball, he must immediately pass it across the circle to a player facing him. He may not pass it to a player on his own half of the circle. The center player tries to stop the ball, in order to get another chance to pass it out of the circle. The circle players should try to prevent this by quick passing.

Relay Games

Relay games may be played in a playroom or a classroom as well as outdoors. Some of them are equally good as winter or summer sports. Starting points and goals should be clearly marked for these games. Lime or sand may be used.

Flag Relay Race.—Players may be divided into any number of teams, with from eight to ten members each. The playing field should be from 30 feet to 50 feet in length, with well-marked starting points and goals for each team. Each player in turn carries the team's color flag from the starting point to the goal and back to the next runner.

Eraser Relay.—Have every seat in a certain number of rows filled, or arrange the rows so that the same number of players sit in each. Fill the seats toward the front of the room, and do not allow a vacant seat between two players. Place an eraser on the front desk in every row. At a signal the first player in every row takes the eraser in both hands and passes it over his head to the player behind him, who in turn passes it until it reaches the last player in the row. When the last player has the eraser, he leaves his seat from the right-hand side, runs forward on the right-hand side of his row, and taps the eraser on the rack at the front of the room. As soon as he leaves his seat, the player just in front of him moves into it, from the left side, and so on, up the row, so that the front seat of the row is left vacant. The player who has the eraser now takes the front seat, ready to pass the eraser at the signal. This gives each player in the row a chance to sit once in the last seat.

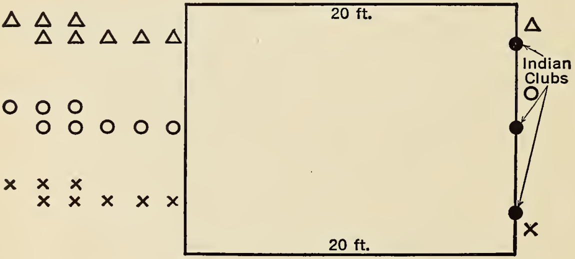
The winner of each round scores 5 points for his row. Leaving the seat from the wrong side, failure to have front seat vacant for player with eraser, or failure to tap eraser on rack is penalized by the loss of 1 point. Winning row has highest total score after penalties are deducted.

Hopping Relay.—Place twenty bean bags or cardboards on the floor in two rows, the rows three feet apart and the bags fifteen inches apart. Divide the players into four equal teams—A, B, C, and D. Two players—one each from teams A and B—toe the starting line, two feet from the first bean bags. At the signal they hop over their bags on the right foot to the other end of the row and immediately hop back on the other foot. The player who first crosses the starting line scores 5 points for his team; a point is deducted for each time the player steps on a bag or touches the floor with his other foot. When all players on teams A and B have hopped, total scores made for each team are added up. The team wins whose players have scored most points.

The players of teams C and D then hop, and the winner plays the winner of A and B for the championship.

The following variations may be used: 1. Jump with both feet. 2. Hop, holding one foot. 3. Hop backwards. (Put fewer bean bags in each row when this variation is used.)

Playground Bowling.—Players may be divided into any number of teams, with from eight to ten members each. The playing field should be 20 feet long and wide enough for all the teams. A large Indian club is placed on the goal line opposite the starting point for each team.



Each player in turn tries to knock over the club on his goal line by bowling a large practice ball.

Each team has a goal keeper, who passes the ball back to the next player and sets up the club if it is knocked down.

Another way to play is to have the team line up behind the Indian clubs. In that case a player takes the ball, runs to the starting line, and bowls. The ball is caught by the next player, who runs to the starting line and bowls, and so on, until all have bowled.

Each time a club is knocked down, it counts 1 point for the team. The team finishing first receives 2 points, and the team having the greatest number of points wins.

TAG GAMES

Bear Tag.—A bear is selected, and the other players are divided into two groups, who live in two homes. These homes are on opposite sides of the playing field, as far apart as possible. Midway between the homes is the bear's den.

At a given signal the players run from one home to the other. As they do so, the bear runs out of his den and tags them. The tagged children must return with the bear to his den and become bears. The bears now join hands, and at the next signal they all run out together and tag the other players. Only the two end bears have hands free to tag. If the bear line breaks, the children they have tagged can "escape." The last child to be caught is the next bear.

Ball Tag.—All the players but one form a circle. The remaining player stands in the center of the circle and tosses a small, soft ball into the air, at the same time calling the name of a player in the circle. The one whose name is called must catch the ball and then try to hit one of the other circle players with it. If he fails to catch the ball, a point is scored against him; then the ball is tossed again. If he fails to hit the other player with it, a point is scored against him; then he must become center player, the first center taking his place in the circle. If he catches the ball and makes the hit, the circle player who is hit loses his place in the circle and becomes center player. If the center player tosses the ball so high that it falls outside the circle, 2 points are scored against him. The player with the lowest penalty score wins the game.

A Rabbit Hunt.—Two players are chosen, one to be the "dog" and the other to be the first "rabbit" that is chased. The rest of the players divide into groups of four. Each group chooses one player to be a rabbit, the other three joining hands in a circle to make a "hole," in which the rabbit stands. The holes should be widely scattered over the playing field. If the players are few in number, groups of three may be allowed.

At a given signal the dog starts to chase the rabbit first chosen, who has no hole of his own. The rabbit runs to one of the holes to save himself.

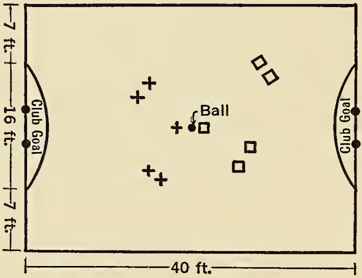
The moment he enters the hole, the rabbit already there must leave it. He in turn runs to another hole, while the dog chases him. There must never be more than one rabbit in a hole. If the dog catches a rabbit before he gets inside the hole, the dog becomes a rabbit and the rabbit becomes a dog.

To give each player a chance to become a rabbit, arrange a general signal at which all play stops, while the rabbit in each hole changes places with one of the players who form the hole. The order in which members of each group become rabbits may be agreed on when the group is formed.

Team Games

All the team games included here may be played indoors, if there is space enough. Windows should be kept open during play.

Club Soccer.—Players are divided into two teams of from one to five members each. The playing field, as shown in the diagram, is 30 feet by 40 feet, with two club goals. Two Indian clubs are set up in each goal. A large playground ball is used.



The game is started from the center of the field, where a player from each team stands beside the ball, placed as in the diagram. At the whistle, each of these two players tries to get the ball and, with the help of his team, to knock down the clubs in the opponent's goal. The game continues for two ten-minute halves.

The ball may be moved by passing, dribbling, or kicking, but may not be held fast in the hands. Opponents must never be pushed, held, or shoved. No player may enter the goal areas except to recover the ball. If any of these rules are broken, the other team gets a free kick from the center of the field.

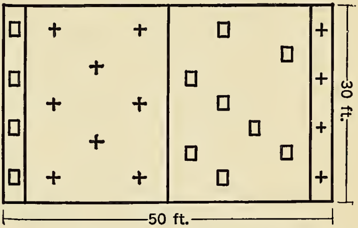
When a ball crosses the side or end lines or enters the goal spaces, it is kicked back into the field by a member of the team which did not touch the ball before it went outside.

Knocking down a club scores 2 points. If a club is knocked down by a free kick, the team scores 1 point.

End Ball.—Players form two teams, with about twelve in each team. One third of the players on each team stay on the bases, and the others are guards in the field, as shown in the diagram (see page 201).

The playing field of 30 feet by 50 feet is divided into four parts: two bases and two large fields for the guards. The center line and the base lines must be clearly marked.

The game is started at the center by a referee, who tosses up a practice or playground ball between two guards. Both guards try to catch the ball and pass it to one of their basemen or to a guard, who in turn passes it back. After a ten-minute half, the teams exchange positions on the field for the second half of the game.



Either team scores a point whenever the ball is passed to one of its basemen. A team scores a point whenever one of its opponents breaks one of the following rules: Players must not step over division lines, must not carry the ball more than one step, and must not hold the ball more than three seconds.

Newcomb.—A variation of end ball, called Newcomb, may be played on the same court by teams of the same size. The players are scattered like the guards for end ball (except that there are no basemen), but the teams are separated by a net or rope stretched across the court at a height of 5 feet. Each team tries to score a point by getting the ball over the net and on their opponent's side of the floor.

The game is played in two halves of from five to ten minutes each.

SPECIAL CLASSROOM STUNTS AND EXERCISES

Marching, skipping, and running are good activities with which to begin an indoor play period, because they help us to relax and so prepare us for play. Most of the following activities require easy, natural movements. In many of the exercises, counting in rhythm will be found helpful.

Indian File Relay.—The same number of children sit in each row. The rows are numbered, and at a given signal the even-numbered rows stand, run forward and around their row, and so back to their seats. A signal is then given for the odd-numbered rows to run. In each case the winning file of Indians is the row of players who reach their seats and take good positions first. The two winning files may run for the championship.

Treasure Hunt.—The players form two teams, all remaining seated except the two leaders. These take their places in the two rear corners of the room and at a signal try to get the treasure, an eraser, which has been placed at the center front, on the chalk ledge or a chair. The successful one then tries to return to his corner without being tagged by the other leader, thus scoring a point for his team. If he is tagged, his opponents score a point. The "treasure" is then replaced, and the second members of each team "hunt" for it.

Jumping-Jack.—Play as a relay or, if space permits, as a general exercise. Each Jack stands, jumps with feet apart, flings his arms sideways and upwards, and claps his hands over his head. He then jumps back to standing position. The group may repeat this ten or more times all together. If played as a relay, the last Jack in each row performs, sits down, and tags the Jack in front of him, and so on, down the row.

FARM STUNTS

Horseshoe Bend.—Begin in the standing position with feet wide apart and hands on hips. Swing right arm sideways and upward and bend body to the left. Return right arm to hip, bend body to the right, and swing left arm sideways and upward. Count three each for both right and left movements, and repeat four or more times.

Churning.—Begin from the standing position, feet about four inches apart and toes as near together as heels. Raise the heels and bend the knees slightly, in a churning motion. Be sure to keep the back perfectly straight. Count two and repeat from ten to twenty times.

SCOUT STUNTS

Wig Wag.—Begin with the standing position, feet parallel and arms at sides. Fling the left arm sideways and upward and the right leg out to the side; then bring both back to standing position. Continue in the same way, using the right arm and the left leg. Repeat seven or more times for each side. Count three for taking the stunt position and two for returning to standing position.

Raising the Flag.—Begin with the standing position. Raise the right arm upward and place the left arm at the front of the waist, as if grasping a rope. Next pull the rope down with the right hand, while the knees bend. Then raise the left hand to grasp the rope, and straighten the knees. The flag raising may be repeated ten or more times. Count about six.

POSTURE STUNTS

Posture Forms.—(*a*) Begin with the standing position, feet about four inches apart and parallel, arms at sides but with palms of hands horizontal. On the first count push the palms down hard on the air; on the second count let them go, and relax them. Repeat at least five times.

(*b*) Begin with the standing position, feet about four inches apart and parallel, and the palms of the hands on top of the head. On the first count stretch the body up hard against the hands; on the second count relax. Repeat at least five times.

Jack-in-the-Box.—Begin with the best possible standing position, feet apart but parallel and hands on hips. Count: *one,* up on toes; *two,* knees bend deeply; *three,* knees straighten; *four,* heels down. Repeat up to ten or twelve times. The back should be kept very straight and the head held up throughout this stunt.

SEASIDE STUNTS

Scooping up Sand.—Begin with feet apart, in the standing position. Place the hands between the feet, as if scooping up sand, and then raise them, as if to throw the sand over the head, as the body is straightened. Slowly count about five for the complete movement. This may be repeated at least ten times.

Bobbing.—Take correct standing position, with the feet together. Bend the trunk downward, letting the hands touch the floor but keeping the knees straight. Without changing this position, pull the head and trunk farther down with a bobbing motion, three times, and then return to the upright position. Repeat in rhythm, about five times.

Athletic Ability Tests

Every boy and girl should learn to run, jump, and throw. After you have practiced, you will be interested in testing your ability. Suggestions for tests are published by athletic associations * and by our National Bureau of Education.† The best tests are graded according to the height and weight of the players.

The following (see page 206) are some of the tests given for boys and girls of your age:

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* Playground and Recreation Association of America, 315 Fourth Ave., New York, N. Y.

† *Athletic Badge Tests for Boys and Girls.* Physical Education Series No. 2. Price 5 cents, from the Government Printing Office, Washington, D. C.

Athletic Ability Tests for Boys 11 to 12 Years

Tests	Time or Distance
1. 75-yard dash or	10 to 13 seconds
100-yard dash	14 to 16 seconds
2. Running broad jump or	8 to 10 feet
High jump	2 to 3½ feet
3. Playground ball throw or	50 to 100 feet
Baseball throw	100 to 150 feet
4. Rope climbing or	12 to 16 feet
Pull-up chinning	2 to 8 times

Athletic Ability Tests for Girls 11 to 12 Years

Tests	Time or Distance
1. 50-yard dash or	7 to 9 seconds
Potato race (224 feet)	20 to 25 seconds
2. Standing broad jump or	3½ to 6½ feet
High jump	2⅓ to 3 feet
3. Playground ball throw or	30 to 75 feet
Basket ball goal throw (from 12-foot line)	3 in 6 throws

TESTING YOUR HEALTH KNOWLEDGE

TEST I

(Chapters I and II)

Choose from the list below the sentences the word needed to make each sentence complete and also true:

1. All living things have the power to ______.
2. We call the study of the care of the body ______.
3. Gasoline, electricity, or coal supplies ______ to run machines.
4. What gasoline does for the automobile ______ does for the body.
5. The bony framework of the body is called the ______.
6. What happens to food inside the body is called ______.
7. Food is carried through the body by the ______.
8. Air for breathing is received into the body by the ______.
9. Blood is pumped through the blood vessels by the ______.
10. The brain and nerves act as ______ for the body machine.

blood
controls
digestion
energy
food
grow
heart
hygiene
lungs
skeleton

TEST II

(Chapter III)

In each set of words in parentheses there is a group of words which will make each sentence complete and true. Choose the right word or words needed to complete that statement.

1. The children found out how much Brownie was growing by (weighing him, asking their teacher, looking at him, guessing).

2. Brownie lost weight when he was (kept in the sunshine, given raw carrots, fed by different children each day, given too many apples).

3. It is important to measure growth, because growth is usually (very rapid, interesting to watch, very slow, a sign of good health).

4. Records of growth are kept for the class in order to (see who is tallest and heaviest, give us practice in making out cards, please our parents, make sure that each child is growing as much as he should).

5. My gain in height for this year should be (about 7 or 8 inches, 2 or 3 inches, just what it was last year, at least 10 inches).

6. My monthly gain in weight should be (at least three pounds, too small to notice, from half a pound to a pound).

7. Poor food, loss of sleep, or not enough exercise will (increase, completely stop, have no effect on, interfere with) my growth.

8. A child's normal weight depends (on both his height and his age, only on his age, only on his height).

9. To gain in weight, it is best for me to (add fat only, grow in all parts of my body, add height only).

10. If I am not growing normally, I should (worry about being too small, check up on my health habits, study harder, forget all about it).

Test III

(Chapter IV)

Choose the correct ending for each statement:

1. If I were shipwrecked on a desert island, I would first of all
   (*a*) look for food and water.
   (*b*) sit down and cry.
   (*c*) make a map of the shore.
   (*d*) write down my experiences.

2. The most important strength-giving foods are those which
   (*a*) come in pretty packages.
   (*b*) contain starch, fat, or sugar.
   (*c*) have plenty of lime in them.

3. Proteins and minerals are
   (*a*) body-building foods.
   (*b*) strength-giving foods.
   (*c*) not needed by children as food.

4. The foods which supply most heat and energy are sometimes called
   (*a*) fuel foods. (*c*) proteins.
   (*b*) vitamins. (*d*) minerals.

5. If my body were not supplied with heat and energy,
   - (*a*) it would gain weight rapidly.
   - (*b*) I should feel very active.
   - (*c*) I could carry heavier weights.
   - (*d*) all my signs of life would stop.

6. Bread, oatmeal, rice, and corn are
   - (*a*) good fuel foods.
   - (*b*) good body builders.
   - (*c*) rich in minerals.

7. One third of all the energy food of the American people comes from
   - (*a*) their large herds of cattle.
   - (*b*) their rice plantations.
   - (*c*) their great fields of wheat, oats, and corn.

8. Dates, beets, honey, figs, and plums are fuel foods because they contain
   - (*a*) sugar. (*b*) lime. (*c*) water. (*d*) protein.

9. Fuel foods rich in fats are
   - (*a*) rice, oatmeal, corn starch.
   - (*b*) butter, cream, salad oil, bacon, nuts.
   - (*c*) bread, beans, potatoes.
   - (*d*) fruit and green vegetables.

10. People need plenty of fuel food
    - (*a*) in cold weather and when they are doing active work or playing hard.
    - (*b*) in very hot weather.
    - (*c*) when they are not moving about a great deal.
    - (*d*) when they are gaining weight too rapidly.

Test IV

(Chapter V)

Choose from the list below the sentences the right word or words needed to complete each sentence:

1. The most nearly perfect of all growth foods is ______.

2. The part of milk used for making cheese is the ______.

3. Milk tastes sweet because it contains ______.

4. Cream is the ______ found in milk.

5. When baby rats were given milk from which both protein and mineral had been taken, they stopped ______.

6. Phosphorus, iron, and ______ are three minerals needed by our bodies.

7. Milk and green vegetables are rich in ______.

8. Milk, eggs, and meat supply ______.

9. Leafy green vegetables, eggs, lean meat, and some fruits supply ______.

10. Doctors say that a child should drink ______ of milk a day.

minerals
one quart
lime
sugar
growing
phosphorus
milk
fat
iron
protein

Test V

(Chapter VI)

From the list of words below the sentences choose the right word or words needed to complete each sentence:

1. Vitamins are sometimes called ______ foods.

2. The vitamins found in milk, in plant juices, and in some fats help to keep people ______.

3. A daily diet which includes milk, cream, butter, oranges, grapefruit, tomatoes, and green-leaf vegetables contains all the different kinds of ______.

4. A baby rat kept without vitamins did not ______ properly.

5. The little rat who had vitamins in his food was healthy and good-tempered, but the rat who had no vitamins was often ______.

6. Plants which make vitamins, proteins, and starch get their power from the rays of the ______.

7. In order to make the vitamin which helps to build bones and teeth, children must have ______.

8. Sunlight which has passed through ordinary ______ has lost the power to help the body make vitamins.

9. A food which has the same power as outdoor sunlight to help make vitamins is ______.

10. Cod-liver oil is a particularly useful food in ______.

sunlight
vitamins
sick and cross
cod-liver oil
window glass
healthy
winter
protective
sun
grow

Test VI

(Chapter VII)

Choose the right ending for each sentence:

1. An ideal diet contains the foods which
   (*a*) are the right ones for body building, fuel, and health.
   (*b*) do not spoil easily.
   (*c*) can be eaten in a hurry.

2. My meals for every day should include
   - (*a*) meat at every meal, bread and butter, coffee, milk.
   - (*b*) cereal, bread and butter, milk, green vegetables, fruit.
   - (*c*) pickles, cereal and milk, eggs, green vegetables.
   - (*d*) tea or coffee, milk, bread and butter, fruit.

3. Spinach, lettuce, cabbage, beet tops, dandelions, and chard are
   - (*a*) root-vegetables.
   - (*b*) seed-vegetables.
   - (*c*) leaf-vegetables.

4. Beets, carrots, onions, and potatoes are
   - (*a*) root-vegetables.
   - (*b*) seed-vegetables.
   - (*c*) leaf-vegetables.

5. Vitamins are abundant in
   - (*a*) root-vegetables.
   - (*b*) seed-vegetables.
   - (*c*) leaf-vegetables.

6. I can learn to like a new food by
   - (*a*) eating a little each time it is served.
   - (*b*) promising to eat it in return for a visit to the pictures.
   - (*c*) eating things that I like better first.

7. Children who come to school with a breakfast of only bread and coffee are pretty sure to be
   - (*a*) overweight.
   - (*b*) underweight.
   - (*c*) good at games.
   - (*d*) good at lessons.

8. The little white rat who drank coffee every day became
   (*a*) sick. (*b*) cross. (*c*) fat. (*d*) thin.

9. As two thirds of my weight is water, I should
   (*a*) drink water only once a day.
   (*b*) drink five or six glasses of water a day.
   (*c*) drink only one glass of water with each meal and none between meals.

10. When buying food from a shop, be sure to choose
   (*a*) food that is exposed to the air.
   (*b*) food in good-looking packages.
   (*c*) food that has been kept clean.

TEST VII

(Chapters VIII and IX)

From the list on page 215 choose the right word or words needed to complete each sentence:

1. ______ gives the signal when your stomach is ready for a meal.

2. Saliva, the digestive juice found in the mouth, changes ______ into sugar.

3. The stomach should receive only ______ food from the mouth.

4. The digestive juices in the stomach dissolve the ______ in our food.

5. Digestion is completed while the food is in the ______.

6. The digested food is liquid and passes into the ______.

7. The waste matter which remains is passed out of the body by movements of the ______.

8. These movements should occur ______.

9. Drinking a glass of water in the morning when you first get up will help to make the large intestine ______.

10. Digestion goes on more easily when people feel ______.

11. Do not take a bath or exercise violently within ______ after a meal.

12. The mineral food most needed for building good teeth is ______.

13. Decay of the teeth is due to ______.

14. The first way to keep the teeth clean is to eat food, like dry toast and apples, which gives them plenty of ______.

15. The second way to keep the teeth clean is to use a ______ at least twice a day.

bacteria
small intestine
half an hour
starch
blood
lime
well-chewed
hunger
active
proteins
toothbrush
large intestine
once a day
cheerful
work

Test VIII

(Chapter X)

Read each of the following statements and decide whether it is true or false. Think carefully before you decide, for your teacher may ask you to give a reason for your answer.

1. I always stop breathing while I sleep.

2. Good air for breathing has no taste, smell, or color.

3. The body needs both air and fuel to keep up its heat.

4. I can store up enough air in my lungs to last for half an hour.

5. A candle will go on burning in a tight-covered jar until it is all burned away.

6. Oxygen is needed by all living creatures.

7. Air passes from the nose and mouth directly into the lungs.

8. Each lung is made up of many small air chambers.

9. The walls of these air chambers are covered with a network of fine blood vessels.

10. Waste substances pass from the air into the blood, and oxygen passes from the blood into the air.

11. Deep breathing is a bad habit, because it lets too much air into the lungs.

12. The blood carries oxygen and food to all parts of the body.

13. The blood vessels in the lungs unite to form large tubes which carry the blood to the heart.

14. The heart contracts and relaxes once every hour.

15. The large blood vessels which carry blood away from the heart are called veins; those which carry blood to the heart are called arteries.

16. When the doctor counts a person's pulse, he is counting the waves of pressure sent along the arteries at each beat of the heart.

17. The red cells of the blood are its oxygen carriers.

18. The blood gets rid of carbon dioxide gas while passing through the lungs.

19. It is better to breathe through the mouth than through the nose.

20. Keeping nose, throat, and lungs clean helps to keep them healthy.

TEST IX

(Chapters XI and XII)

Read each of the following statements and decide whether it is true or false. Think carefully before you decide, for your teacher may ask you to give a reason for your answer.

1. If a doctor takes your temperature on a cold day in winter, his thermometer will show exactly the same temperature as it would show on a warm day in summer.

2. In cold weather the blood vessels of the skin contract so as to let the blood lose heat more slowly.

3. On a hot day the skin opens its sweat glands so that moisture can evaporate and cool the skin.

4. We can help the skin do its work by keeping our rooms at a very low temperature.

5. The air in a room full of people soon becomes unpleasantly warm and stuffy if fresh air is not supplied.

6. To ventilate a room is to supply it with large windows to let in sunshine.

7. Drafts are dangerous to health because they cool the body too rapidly.

8. People in India, Arabia, England, and Greenland wear very different kinds of clothing, because they think it looks picturesque to dress differently.

9. Comfortable outdoor clothing for cold weather is generally made of furs and woolens; for hot, sunny weather it should be very thin and light; for wet weather it should include rubbers and a raincoat.

10. Working feet must have shoes that are much longer than the feet.

TEST X

(Chapter XIII)

Choose the right words to complete each statement:

1. Good standing posture means (toes turned out, toes pointing straight ahead), weight placed (equally on both feet, mostly on the left foot), and head held (back, erect.)

2. Children's bodies are like those of (horses, beetles, jellyfish), because they (have no bones, have their hard parts outside, are built over a bony framework).

3. My skeleton is made up of (a few large bones, thousands of little bones, about two hundred bones).

4. Good sitting posture means body bent only at (knees and waist, elbows and neck, waist and neck, waist and shoulders).

5. Bones are kept in position and moved about by means of (joints, rubber bands, muscles).

6. The most important point in all good posture is to keep the (back, leg, stomach, chest) muscles (perfectly slack, pulled in).

7. If my seat at school is not comfortable for good posture, I should (try to forget the discomfort, tell my teacher about it, take whatever posture makes me comfortable).

8. An arched foot is (stronger, weaker) than a flat one and (better-looking, not so good-looking).

9. Muscles are trained to good posture by (plenty of rest, good hearty food, daily practice).

10. Good health and comfort, as well as good looks (are helped by, are harmed by, have nothing to do with) good posture.

TEST XI

(Chapter XIV)

Choose the right words to complete each sentence:

1. If your muscles are sore after a game, (play the same game harder next day, stop all exercise for a week, exercise them gently for a day or two).

2. Every child should play out of doors every day for at least (two hours, six hours, three hours).

3. Special exercises for good posture and to get your muscles into training are (too much trouble to take, a waste of time, sometimes necessary).

4. Running or swimming races, and jumping or throwing tests are (interesting whether one comes out first or not, interesting if one always comes out with a high score, not so interesting as moving pictures).

5. Folk dances are good practice in posture, but they are also (good fun in themselves, too hard to learn, not so much fun as listening to the radio).

6. In any game the most important thing is to (win, play fairly, avoid getting hurt).

7. Our games at school (are good training for, unfit us for, have nothing to do with) the work we shall do when we grow up.

8. We shall need strong, healthy bodies when we grow up, because we shall probably (have to hunt and fight in order to live, become professional athletes, have plenty of hard work to do).

9. Games played by a team are good training because they give each child a chance to (show what he can do, avoid

being blamed for his mistakes, let others do the hard work, make the rest do as he says, share both work and credit with others).

10. Sports like swimming, hiking, and skating are good training because they give each child a chance to (make a record, learn to depend on himself in an emergency, get away from the rest).

TEST XII

(Chapter XV)

Choose the right words to complete each sentence:

1. Alcohol is formed from sugar by the action of (heat, sunlight, microscopic plants).

2. The strongest kind of alcoholic drink is (beer, whisky, wine).

3. Alcohol can be used by the body as a source of (vitamins, protein, energy).

4. Alcohol is primarily used as a (food, drug, poison).

5. Alcohol is a (stimulant, narcotic).

6. Alcoholic drinks make one (energetic, sleepy, intelligent).

7. In the long run one can accomplish more work if one drinks (coffee, water, beer).

8. The first effects of alcohol are on the (nervous system, muscles, stomach).

9. The continued use of alcohol is specially harmful to the (bones, digestion, hearing).

10. Those who want to succeed in life should smoke (a little, a great deal, not at all).

TEST XIII

(Chapter XVI)

Tell what is the safe and sensible thing to do in each case:

1. You want to cross a city street.
2. You need to walk down a country road for a stretch.
3. You are in a bus sitting near the driver.
4. You are getting off a street car.
5. You are getting on a street car.
6. You are approaching the bus you want when the bus starts off.
7. Your friends want to play baseball in a street which has not been closed for play.
8. A friend with whom you are out swimming wants you to go beyond the safety zone.
9. You have to get something from the top shelf of a tall cupboard.
10. You want to find something in a dark closet.

CAGES AND CARE FOR WHITE RATS *

Making the Cages.—Before you get your rats, you should have a home for them. The following materials will make two rat cages:

8 to 10 square feet of galvanized wire netting, $\frac{1}{4}$ inch mesh
2 tin dripping pans about 8 by 12 inches
Soft wire
1 feeding cup per cage ($\frac{1}{2}$ to 1 oz. size)
2 drinking cups per cage ($\frac{1}{2}$ to 1 oz. size)
1 nest per cage (small tin box or glass jar)
Plenty of paper towels or other soft paper
2 heavy cloths for covering cages on cold nights

The tin pan will form the base of your cage. Small glass salve jars, which can be bought in a drug store, will do for your food, milk, and water cups. They should be wired to the cage to prevent spilling. The nest to protect the little rat from cold should be of tin or glass so that it can be cleaned easily. A pint paste jar will do very well.

To make the wire sides of the cage, take a strip of the wire netting 40 by 16 inches, bind it around the pan, and wire the ends together at the seam.

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* See page 48. The study of how foods affect the growth of rats helps us to understand how foods affect our own growth.

A 10 by 14-inch piece should then be bent over the top and wired in place. The wire part of the cage can be lifted on and off the pan base. The whole cage should be kept on a board or tray.

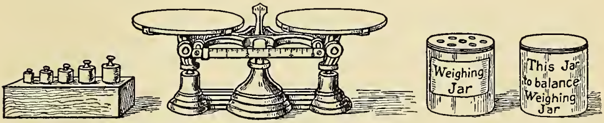
Caring for the Rats.—If you cannot get baby rats from a pet store, the laboratory director of a department of health can tell you where to get them. The rats should be about four weeks old, for at that age they may be taken from their mothers.

Each day the food, milk, water, and nest jars, as well as the pan base of the cage, should be thoroughly cleaned with soap and water.

You will find it convenient to have an extra pan base with food and nest jars. The pan should be lined with a clean paper each morning before the day's supply of fresh food, milk, and water is placed in the cups. The nest jar should also be furnished daily with a clean paper towel.

Milk, buttered toast, dry oatmeal, and lettuce form a very good diet for little white rats. The jars for dry oatmeal, milk, and water should each hold about one tablespoonful of material. The toast should be hard, about one fourth of a small slice, made from whole wheat or rye bread. Lettuce, cabbage, or spinach (five or six square inches of leaf), and the toast may be dropped on the cage floor.

Weighing the Rats.—In order to measure the growth in weight of little rats, you must have very sensitive scales. Gram scales, which can usually be obtained from a high school laboratory, are best. The one-gram weights for the gram scales are tiny things, equal to about one thirtieth of an ounce. A four weeks' old rat will often weigh about thirty grams, or one ounce. When rats are being well fed, they may grow from ten to twenty grams a week.


Weighing Jar
This Jar to balance Weighing Jar

To weigh rats, you will need two weighing jars. Pint-sized paste jars will do nicely. These jars should be weighed and balanced by placing bits of chalk in the lighter one. Place the latter on the left-hand scale plate. Punch air holes in the lid of the other jar. Then put a rat into this weighing jar, place it on the right-hand scale plate, and put as many gram weights as are necessary to balance it on top of the other jar. When the gram weights exactly balance the little rat, count them to learn his weight.

Two Feeding Experiments.—In order to show that milk and leafy vegetables are important growth foods, give two little rats the food described above for one or two weeks. Then continue to give the first the same food and leave out the milk and vegetables from the diet of the second rat. Weigh them both carefully for two or three weeks and keep a record in order to show the difference in their growth.

If a diet of buttered toast, dry oatmeal, and milk is fed to one rat, it may be compared in growth value with a diet of buttered toast, oatmeal, and coffee fed to a second rat. This experiment should show that coffee is not a growth food.

Weight Record for Little Rats

Date	Rat	Age	Weight	Gain or Loss	Remarks
Jan. 10	Snowball	30 days	32 grams		Milk and vegetables every day
" 17	"	37 days	40 grams	8 grams gain	
" 24	"	44 days	52 grams	12 grams gain	
" 31					
Jan. 10	Pinky	30 days	34 grams		No milk or vegetables
" 17	"	37 days	37 grams	3 grams gain	
" 24	"	44 days	37 grams	0 gram gain	
" 31					

MEASURING YOUR GROWTH

Children of a given age differ considerably in weight even for a given height. Some belong to families whose members are naturally tall and slender, others to families whose members are naturally short and stocky.

The main purpose of the tables on pages 230 to 237 is to present a study of growth rather than actual weight. Before you check your weight by the table, you must carefully determine to which physical type (tall, slender; average; or short, stocky) you belong. In case of doubt, it may be helpful to remember that the races from Northwestern Europe are usually of the tall, slender type, while the Southern European or Mediterranean races are usually of the short, stocky type.

The following show how the table may be used:

A fourteen-year-old boy of the tall, slender type, 67 inches tall, is of normal weight if he weighs 128 pounds; is considered underweight if he weighs less than 115 pounds; and is considered overweight if he weighs more than 153 pounds.

A fifteen-year-old girl of the average type, 63 inches tall, is of normal weight if she weighs 116 pounds; is considered underweight if she weighs less than 104 pounds; and is considered overweight if she weighs more than 139 pounds.

After you have decided on your own physical type, find in that part of the table the weight corresponding to your age. No matter to which type you belong, you should gain something each year. A careful study of the part of the table which gives the facts about your type will tell you whether your present weight is too little, normal, or too much for your height, and about how much you should gain each year. From the yearly gain in pounds you can find the desirable monthly gain in ounces. Monthly weighings will reveal whether or not you are gaining weight properly.

If, however, you are not gaining in weight or are losing weight, there is something wrong. It may be that the condition of your teeth or of your tonsils is retarding you. Doctors can correct such conditions. Or, it may be that you are getting not enough food or too much food, or that the food you are getting is the wrong kind. Perhaps you are not getting enough sleep—or enough exercise. Such conditions as these can be easily corrected.

The chart, which you should keep, showing monthly gain in weight is a sort of rough score card for the health game you are playing. It does not matter whether you gain more or less than some other child. The point is to gain, and to gain about the amount that is normal for a person of your type, and height, and age.

How to Weigh and Measure

(U. S. Office of Education)

Age.—Take the nearest birthday.

Height.—Fasten an accurate measure on the wall. Two yardsticks, a new tape measure, or a strip of surgeon's plaster with a scale of inches, halves, and quarters drawn upon it will serve. Have the child stand, without shoes, flat against the wall, with heels, shoulders, and head touching the wall. Place a right-angled piece of wood (a chalk box will answer) firmly over his head and against the measuring scale.

Weight.—Have the child, in indoor clothing but without shoes, stand in the *center* of the scale platform. Teach the child to weigh himself; but in the monthly weighings the teacher should do the weighing. (See that the scales balance before weighing.)

Time.—Weighing and measuring should be done at about the same time of the day, on each occasion, if possible.

The Record.—Enter the height and weight on the classroom weight record. State the monthly weight on the monthly report card. Use one record for each section of the class and pass it on with the section when promoted.

Since this chart is prepared chiefly for its educational value, the health lesson is the most important part of the procedure. The relation of good health conditions to growth should be emphasized.

The tables give the *more usual* heights and weights, and weight for height, of a large group of school children. While these tables show the general tendency of growth of the group examined, *very many healthy children do not and cannot conform to them.* It is impossible to present tables which would indicate what all children should measure or weigh as this cannot be known.

WEIGHT IN RELATION TO AGE, HEIGHT, AND PHYSICAL TYPE

(Based upon the Tables of Bird T. Baldwin, Ph.D.)

Reprinted through the courtesy of the Director of Physical Education, Philadelphia Public Schools

TALL, SLENDER TYPE									AVERAGE TYPE									SHORT, STOCKY TYPE								
BOYS					GIRLS				BOYS					GIRLS				BOYS					GIRLS			
Weight (Lbs.)						Weight (Lbs.)			Weight (Lbs.)						Weight (Lbs.)			Weight (Lbs.)						Weight (Lbs.)		
Underweight	Overweight						Overweight	Underweight	Underweight	Overweight						Overweight	Underweight	Underweight	Overweight						Overweight	Underweight
Under	Over	Normal Weight	Age (Years)	Height (Inches)	Age (Years)	Normal Weight	Over	Under	Under	Over	Normal Weight	Age (Years)	Height (Inches)	Age (Years)	Normal Weight	Over	Under	Under	Over	Normal Weight	Age (Years)	Height (Inches)	Age (Years)	Normal Weight	Over	Under
154	205	171	19	74									74									74				
153	204	170	18																							
151	201	168	17																							
148	197	164	16																							

150	200	167	19	73									73									73			
148	197	164	18																						
146	194	162	17																						
144	192	160	16																						
147	195	163	19	72									72									72			
142	189	158	18																						
140	187	156	17																						
140	187	155	16																						
138	183	153	15																						
137	182	152	17	71					143	191	159	19	71									71			
136	181	151	16						139	185	154	18													
135	180	150	15																						
133	177	148	17	70					140	187	155	19	70									70			
130	174	145	16						135	180	150	18													
130	173	144	15																						
129	172	143	14																						
125	167	139	15	69	18	142	170	128	137	182	152	19	69									69			
125	167	139	14		17	140	168	126	134	179	149	18													
					16	138	166	124	131	175	146	17													
									129	172	143	16													
121	161	134	15	68	18	138	166	124	132	176	147	19	68									68			
121	161	134	14		17	138	166	124	129	172	143	18													
					16	136	163	122	127	169	141	17													
					15	135	162	121	123	164	137	16													
					14	133	160	120																	

WEIGHT IN RELATION TO AGE, HEIGHT, AND PHYSICAL TYPE *(Continued)*

(Based upon the Tables of Bird T. Baldwin, Ph.D.)

Reprinted through the courtesy of the Director of Physical Education, Philadelphia Public Schools

TALL, SLENDER TYPE								
BOYS					GIRLS			
Weight (Lbs.)						Weight (Lbs.)		
Underweight Under	Overweight Over	Normal Weight	Age (Years)	Height (Inches)	Age (Years)	Normal Weight	Overweight Over	Underweight Under
				67	18	135	162	121
					17	133	160	120
115	153	128	14		16	133	160	120
					15	131	157	118
					14	130	156	117
				66	18	130	156	117
110	146	122	14		17	129	155	116
107	143	119	13		16	128	153	115
107	143	119	12		15	125	150	112
					14	124	149	112
					13	124	114	112

AVERAGE TYPE								
BOYS					GIRLS			
Weight (Lbs.)						Weight (Lbs.)		
Underweight Under	Overweight Over	Normal Weight	Age (Years)	Height (Inches)	Age (Years)	Normal Weight	Overweight Over	Underweight Under
122	163	136	17	67				
121	161	134	16					
117	156	130	15					
119	158	132	17	66				
115	153	128	16					
112	150	125	15					

SHORT, STOCKY TYPE								
BOYS					GIRLS			
Weight (Lbs.)						Weight (Lbs.)		
Underweight Under	Overweight Over	Normal Weight	Age (Years)	Height (Inches)	Age (Years)	Normal Weight	Overweight Over	Underweight Under
128	170	142	19	67				
125	167	139	18					
125	167	139	19	66				
122	163	136	18					

105	140	117	**13**	**65**	**15**	122	146	110	110	146	122	**16**	**65**	**18**	126	151	113	121	161	134	**19**	**65**				
					14	121	145	109	108	144	120	**15**		**17**	125	150	112	118	157	131	**18**					
					13	120	144	108	106	142	118	**14**		**16**	123	148	111	115	152	127	**17**					
100	133	111	**13**	**64**	**13**	115	138	103	103	138	115	**15**	**64**	**18**	123	148	111	117	156	130	**19**	**64**				
98	131	109	**12**		**12**	114	137	103	102	136	113	**14**		**17**	122	146	110	113	151	126	**18**					
														16	120	144	108	109	145	121	**17**					
														15	119	143	107	105	140	117	**16**					
														14	117	140	105									
96	128	107	**13**	**63**	**13**	110	132	99	99	132	110	**15**	**63**	**18**	120	144	108	115	152	127	**19**	**63**				
95	127	106	**12**		**12**	110	132	99	97	130	108	**14**		**17**	119	143	107	111	148	123	**18**					
														16	117	140	105	106	142	118	**17**					
														15	116	139	104	102	136	113	**16**					
														14	112	134	101									
91	121	101	**12**	**62**	**12**	105	126	94	93	123	103	**14**	**62**	**15**	113	136	102	100	133	111	**17**	**62**	**18**	118	142	106
									92	122	102	**13**		**14**	109	131	98	96	128	107	**16**		**17**	117	140	105
														13	106	127	95	94	125	104	**15**		**16**	115	138	103
86	115	96	**12**	**61**	**12**	100	120	90	89	119	99	**14**	**61**	**14**	105	126	94	93	123	103	**16**	**61**	**18**	116	139	104
85	114	95	**11**		**11**	99	119	89	87	116	97	**13**		**13**	101	121	91	90	120	100	**15**		**17**	113	136	102
																							16	112	134	101
																							15	108	130	97
83	110	92	**12**	**60**	**12**	95	114	85	84	112	93	**13**	**60**	**13**	97	116	87	86	115	96	**16**	**60**	**18**	111	133	100
83	110	92	**11**		**11**	95	114	85										85	114	95	**15**		**17**	109	131	98
																		85	113	94	**14**		**16**	108	130	97
																							15	105	126	94
																							14	101	121	91
79	106	88	**11**	**59**	**11**	90	108	81	80	107	89	**13**	**59**	**13**	92	110	83	81	108	90	**15**	**59**	**16**	103	123	93
78	104	87	**10**		**10**	87	104	78	80	107	89	**12**		**12**	90	108	81	81	108	90	**14**		**15**	100	120	90
																							14	96	115	86

WEIGHT IN RELATION TO AGE, HEIGHT, AND PHYSICAL TYPE *(Continued)*

(Based upon the Tables of Bird T. Baldwin, Ph.D.)

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TALL, SLENDER TYPE									AVERAGE TYPE									SHORT, STOCKY TYPE								
BOYS					GIRLS				BOYS					GIRLS				BOYS					GIRLS			
Weight (Lbs.)			Age (Years)	Height (Inches)	Age (Years)	Weight (Lbs.)			Weight (Lbs.)			Age (Years)	Height (Inches)	Age (Years)	Weight (Lbs.)			Weight (Lbs.)			Age (Years)	Height (Inches)	Age (Years)	Weight (Lbs.)		
Underweight	Overweight	Normal Weight				Normal Weight	Overweight	Underweight	Underweight	Overweight	Normal Weight				Normal Weight	Overweight	Underweight	Underweight	Overweight	Normal Weight				Normal Weight	Overweight	Underweight
Under	Over						Over	Under	Under	Over						Over	Under	Under	Over						Over	Under
76	101	84	11	58	11	86	103	77	76	102	85	12	58	12	86	103	77	78	103	87	15	58	15	96	115	86
76	101	84	10		10	84	101	76										77	103	86	14		14	93	112	84
																		76	102	85	13		13	88	106	79
72	96	80	10	57	10	82	98	74	73	97	81	12	57	12	82	98	74	75	100	83	14	57	14	88	106	79
									73	97	81	11		11	82	98	74	74	98	82	13		13	84	101	76

69 68	92 91	77 76	10 9	**56**	10 9	78 76	94 91	70 68	69 69	92 92	77 77	12 11	**56**	12 11	79 78	95 94	71 70	70 70	94 94	78 78	14 13	**56**	14 13	83 81	100 97	75 73
65	86	72	9	**55**	9 8	74 72	89 86	67 65	66 66	88 88	73 73	11 10	**55**	11 10	74 74	89 89	67 67	67 67	89 89	74 74	13 12	**55**	13 12	77 75	92 90	69 67
63 63	84 84	70 70	9 8	**54**	9 8	70 69	84 83	63 62	63	84	70	10	**54**	11 10	71 70	85 84	64 63	64 64 63	85 85 84	71 71 70	13 12 11	**54**	13 12	73 71	88 85	66 64
60	80	67	8	**53**	8	67	80	60	60 60	80 80	67 67	10 9	**53**	10 9	68 67	82 80	61 60	61 60	82 80	68 67	12 11	**53**	12 11	69 68	83 82	62 61
58 57	77 76	64 63	8 7	**52**	8 7	64 63	77 76	58 57	58	77	64	9	**52**	10 9	64 64	77 77	58 58	58 58	77 77	64 64	11 10	**52**	12 11	67 65	80 78	60 58
55	73	61	7	**51**	7	59	71	53	55 55	73 73	61 61	9 8	**51**	9 8	61 60	73 72	55 54	55 55	73 73	61 61	11 10	**51**	12 11 10	65 63 61	78 76 73	58 57 55
52 51	70 68	58 57	7 6	**50**	7 6	56 56	67 67	50 50	52	70	58	8	**50**	8	57	68	51	52 52	70 70	58 58	10 9	**50**	11 10 9	61 59 58	73 71 70	55 53 52
49	66	55	6	**49**	7 6	54 54	65 65	49 49	49 49	66 66	55 55	8 7	**49**	8	55	66	49	49 49	66 66	55 55	10 9	**49**	10 9	56 55	67 66	50 49
47	62	52	6	**48**	6	52	62	47	48	64	53	7	**48**	7	52	62	47	48 48	64 64	53 53	9 8	**48**	10 9 8	53 52 52	64 62 62	48 47 47
44	59	49	5	**47**	6 5	50 49	60 59	45 44	45 45	60 60	50 50	7 6	**47**	7	50	60	45	45 45	60 60	50 50	9 8	**47**	9 8	50 50	60 60	45 45

WEIGHT IN RELATION TO AGE, HEIGHT, AND PHYSICAL TYPE *(Continued)*

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TALL, SLENDER TYPE									AVERAGE TYPE									SHORT, STOCKY TYPE								
BOYS					GIRLS				BOYS					GIRLS				BOYS					GIRLS			
WEIGHT (Lbs.)			Age (Years)	Height (Inches)	Age (Years)	WEIGHT (Lbs.)			WEIGHT (Lbs.)			Age (Years)	Height (Inches)	Age (Years)	WEIGHT (Lbs.)			WEIGHT (Lbs.)			Age (Years)	Height (Inches)	Age (Years)	WEIGHT (Lbs.)		
Underweight	Overweight	Normal Weight				Normal Weight	Overweight	Underweight	Underweight	Overweight	Normal Weight				Normal Weight	Overweight	Underweight	Underweight	Overweight	Normal Weight				Normal Weight	Overweight	Underweight
Under	Over						Over	Under	Under	Over						Over	Under	Under	Over						Over	Under
42	56	47	5	46	5	47	56	42	43	58	48	6	46	7	47	56	42	43	58	48	8	46	9	48	58	43
														6	47	56	42	43	58	48	7		8	48	58	43

			45	5	45	54	40	41 41	55 55	46 46	6 5	**45**	6	45	54	40	41 41	55 55	46 46	8 7	**45**	8 7	45 45	54 54	40 40
			44	5	42	50	38	40	52	44	5	**44**	6	42	50	38	40 40	53 53	44 44	7 6	**44**	7	42	50	38
			43									**43**	5	41	49	37	37 37 37	49 49 49	41 41 41	7 6 5	**43**	7 6	41 41	49 49	37 37
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